RAILROAD GAZETTE

FRIDAY, AUGUST 9, 1895.

CONTENTS

Contributions.

Tramps on Freight Trains.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Allow me to call your attention to an item published in the daily papers of Aug. 3 telling of a freight wreck on the Fort Wayne road, near Canton, O., in which two tramps were killed and seven injured. The reader of the item will note that there were 13 men stealing rides in a furniture car. Whether there were more on this particular train or not I am not advised.

It is quite unusual at this late day to be able to call attention to any new source of revenue in the transportation business. For that reason it seems to me that the attention of railroad managers ought to be pretty sharply called to the large amount of revenue that might be had if the people now carried free on freight trains were transported as paying passengers. Certainly in the most palmy days of the distribution of free passes there was never so much free transportation furnished on passenger trains as is now being furnished on freight trains.

If half as much money as is now spent by the Passenger Department in advertising were to be spent in properly policing railroad property, there is no question that much greater results would be obtained. It need not, however, cost anything like that amount of money to bring the police department of the railroads into proper working order. For the most part, their watchmen are now cripples or aged and infirm employees. If these were to be replaced with able-bodied men between 25 and 40, and some slight additions were made to the force, and it was put in the hands of a capable officer, not only could this particular abuse be broken up, but there would be a large decrease in loss and damage to freight and in other depredations on the property. F.

A Neglected M. C. B. Standard.

NEW YORK, Aug. 1, 1895.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In view of the ever present talk about non-conformance with M. C. B. standards I think that it may interest you and your readers to know that a standard adopted in 1893 is being rather badly neglected. It is a standard that may be easily followed, as far as I know; one against which I can see no objection, and one, the observance of which would save money and trouble, not only to railroad companies, but to coupler manufacturers.

I refer to the standard size and position of the hole in the drawbar tail or shank provided for the continuous draft appliance (see M. C. B. Standard Sheet 11, and page 420 M. C. B. *Proceedings* for 1894).

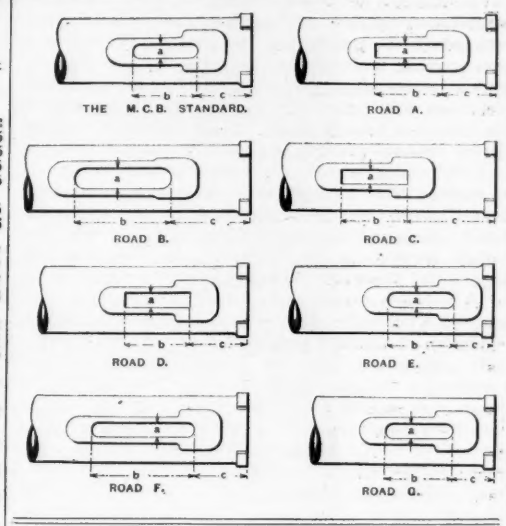
The standard, as published by the M. C. B. Association in its sheet 11, shows the distance from the end of the bar to the hole as 4 in., the length of the hole as 5⅛ in., and the width of the hole as 1⅛ in.; the hole is shown with rounded corners.

Now these dimensions are seriously departed from on a number of our leading lines. The drawing herewith shows the practice on seven railroad lines, and also the M. C. B. standard. I feel that I may reasonably assume that similar variations will be found on many other railroads. It will be noted that the distance from the end of the bar to the end of the hole ranges on these few roads from 3 in. to 6 in.; that the length of the hole ranges from 5⅛ in. to 8 in., and that the width of the hole ranges from 1 1/16 in. up to 1⅜ in.

Is there any good reason why the standard should not be followed and thus save money and trouble to the manufacturers and also to the railroads? Of course there are many railroads which do not use this form of tail ends on their own cars; but through their enforced carrying of bars for repairs at interchange points they are directly interested in reducing the number of patterns required to be kept in stock.

I may say in closing that this matter came up a short time ago in conversation, and that of at least three persons who discussed it not one knew, or remembered, that a standard covering it existed. One of these three was a leading coupler manufacturer who had been in the business for many years, one was a leading superintendent of motive power who has always been especially interested in the coupler question, and the third was a newspaper man—one of those fellows who are customarily supposed to know everything—still not one of the three recalled the fact that a standard had been adopted.

Query: Is it forgetfulness alone that causes the much-talked-of neglect of standards? STANDARD.



	a	b	c
	inch.	inch.	inch.
M. C. B. Standard	1⅛	5⅛	4
Road A	1⅛	5¼	4¼
Road B	1⅝	7⅛	6
Road C	1⅛	5⅛	6⅜
Road D	1⅛	5⅛	4⅜
Road E	1⅛	5⅛	3
Road F	1⅛	8	4
Road G	1⅛	5⅛	3¼

Lead for Locomotives.

BY C. H. QUEREAU.

It is commonly believed that a certain amount of lead is necessary to furnish a cushion to absorb the inertia of the reciprocating parts as they near the end of the stroke, making them run smoothly. That this is a mistake is evident from the fact, well known to those who have watched the matter when riding a locomotive, that the engine never rides more smoothly than when the throttle is closed, and the only cushion is that due to a slight air pressure and vacuum. This is true for all speeds and cut-offs.

Lead for the Running Cut Off.—The most important point to be considered in discussing the question of lead is the best adjustment for the cut-off which is used most. It will be assumed that this is one-fourth stroke, and the valve gear is of the Stevenson type.

It requires no argument to prove that the lead for the cut-off may be made so great that steam will enter the cylinder several inches before the piston reaches the end of the stroke; that this adjustment would be very bad, causing the engine to "work against herself," pound and jar, increasing the cost of running repairs, preventing more than moderate speed unless a long cut-off and light throttle were used. It is quite probable that the general practice of throttling was acquired largely because of the general use of excessive lead. That there are locomotives running every day with too much lead in the cut-off is shown by the following extracts from letters written within the last six months by men in charge of locomotives on three of the best known western trunk lines. If desirable, a number of other instances can be cited corroborating those given.

(1) "Engine 25, in passenger service, gave us considerable trouble by loosening her cylinders from the frames and breaking deck bolts. This has entirely stopped since her lead was reduced. Engineers report that she rides much easier and is smarter than ever."

(2) "The rule on this road, at least on this division, is to give the valves of all engines ⅛ in. positive lead in full gear. Most of them are hard riding and pound themselves to pieces badly; will run about so fast and no faster, regardless of train. I reduced the lead at 6 in. cut-off to 1/16 in. on one of these engines, and turned her out on the rounds. She did such excellent work that she was the cause of general remark among all the engineers who ran her. Would ride very smoothly, run faster, and do her work easier than ever before."

(3) "These engines, which had 7/16 in. lead at 6 in. cut-off, were pounding badly, and, even with a light train, had to be worked at 8 in. cut-off with a light throttle. I had the lead reduced to ¼ in. in the same cut-off, and found a very remarkable improvement in their working. We had had a great deal of trouble because of hot main pins, and were unable to overcome this till we reduced the lead. Since that was done the number has been reduced about 80 per cent. To experiment farther I selected an engine which had broken five or six piston rods in 18 months, and found that the valves were set with 1/16 in. lead in full forward motion, and ¼ in. in full back motion. This was reduced to 1/16 in. positive lead in full gear forward, and 3/32 in. negative lead in full back motion. The engine has now run nine months since the lead was reduced without breaking a piston rod; all conditions of service the same. With one of our 18 in. × 24 in. engines, handling our limited scheduled at about 40 miles an hour, including stops, each of three engineers was unable to make running time. Since the full gear lead was changed from 3/32 in. positive to 3/32 in. negative they can make up considerable lost time with the same engine." The reduction of the full gear lead reduced the lead in the running cut-off.

In this connection it is interesting to note the reduction in full gear lead made by the following roads on their passenger engines. Comparing their practice in 1882 and 1893 we find the following reductions: L. S. & M S., from ⅛ in. to 0; C., B. & Q., from 1/16 in. to 3/32 in.; C., R. I. & P., from 3/32 in. to 0. The following changes have been made in the lead of the P. R. R. Class P engines: In 1886 it was ⅛ in.; in 1890 it was 1/16 in., and in 1895 it was zero, the valves being set line and line in full forward motion, and with ⅛ in. negative lead in full back gear, giving a reduced mid gear lead of ¼ in.

Not only may there be too much, but too little lead as well. Inasmuch as the lead at 6-in. cut-off is usually not far from 85 per cent. of the maximum port opening, it is evident that a reduction of the lead means a corresponding reduction of the port opening, and that it may easily be carried too far, reducing the power of the engine. Of the two evils, too small a lead is preferable to too much, because, when engines are at running speed most of their work can generally be done at a cut-off less than one-fourth stroke, and will stand another notch or a wider throttle without impairing their economy; but if the lead is too great the engine must be worked at a cut-off approximating one-third stroke and the steam correspondingly throttled. A wasteful practice.

A Zeuner, or other, valve diagram is very useful in designing valve gears and determining the best proportions of the parts, but it does not tell us whether a given lead is too much or too little. The valve diagram will show that a reduced lead decreases the maximum port opening; delays the points of admission, maximum port opening, exhaust opening, and exhaust closure. We must, however, rely on the indicator to learn the exact influence of this change on the steam distribution.

The cards shown in Figs. 1 and 2 were not selected to prove a point, but because the conditions under which they were taken were as nearly alike as possible in service, except the amount of lead. They were all taken from the same locomotive, and with the same valve gear, instrument and operator. The lead for the solid line cards was 1/32 in., and for those shown in broken lines a scant 7/32 in., at 6-in. cut-off. A comparative study of these diagrams is instructive. It shows about the same mean effective pressure for both leads; that the steam line for the smaller lead is but little lower than for the other in spite of the smaller port opening, and probably because the maximum port opening comes later in the stroke; that the later exhaust closure of the smaller lead reduced the compression perceptibly. The most instructive difference is the effect of delaying the point of admission. Not only does the reduced lead show a considerable gain during compression, but the compression line does not abruptly change at the point of admission, as does in the solid line cards, but brings the reciprocating parts to rest with a uniformly increasing pressure, and carries them over the center with less thump and jar. This is effected not only because the point of admission is delayed, but also because the port opening is smaller as the piston approaches the end of the stroke. This, without doubt, is the reason that a reduction of lead stopped the breakage of piston rods and deck bolts, very largely cured the epidemic of hot crank pins, and allowed the engines to ride smoothly.

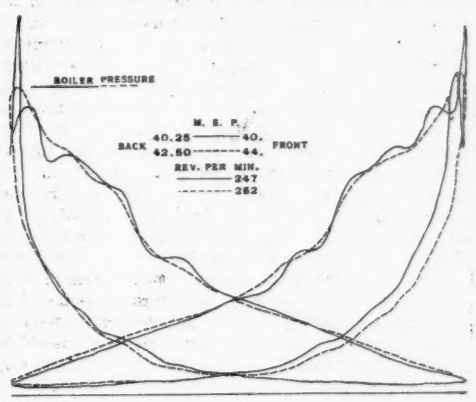


Fig. 1.

It is the opinion of the writer, based on experience and the results of calculations from indicator cards, that a proper adjustment of lead will slightly improve the coal record of a locomotive, because of a somewhat better steam distribution and reduced internal friction, but its chief advantage is a saving in repairs and time lost on the road by engine failures, and the increased capacity of the engine for speed which will follow. The proper

lead is the greatest that can be used and secure a full smooth compression line, without a loop at the top, and can be determined accurately only by using an indicator. Judging by results so obtained, it is the writer's opinion that the correct lead for speeds approximating 250 revolutions per minute, or 51 miles an hour for 68-in. drivers, is not far from $\frac{1}{64}$ in. at one-fourth cut-off for a valve with a $\frac{1}{8}$-in. Allan port and $\frac{1}{4}$ in. for a plain valve. These figures can be used when an indicator cannot.

With the Stevenson valve gear the lead increases as the cut off is shortened, the increase depending mainly on the length of the eccentric blades. The shorter the blades the greater the increase. The blades on a four-wheel connected engine are longer than those on any other type commonly used, and are not often longer than 60 in. This length gives an increase in lead of about $\frac{5}{16}$ in. as the cut-off is shortened from full to mid gear. Admitting that the lead for the running cut-off should not be greater than $\frac{1}{4}$ in., it follows that the lead

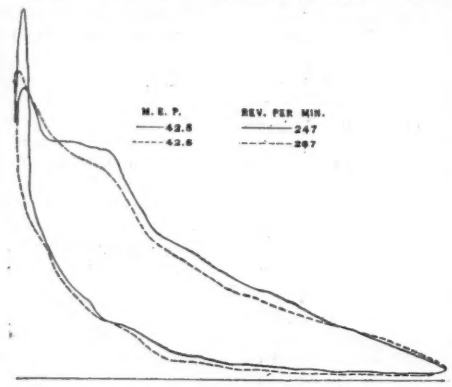


Fig. 7.

on most locomotives in the United States should be reduced. In building new engines the valve gear should be so designed as to secure this result, when possible. For engines already in service it may be accomplished by reducing the full gear lead in three ways, making it negative if necessary to secure the desired lead for the running cut-off. First, by reducing the forward and back gear equally. Second, by reducing the back gear lead more than the forward. Third, by reducing the forward gear lead more than the back. If the same lead for 6-in. cut-off be reached by any of these adjustments of the full gear lead, the resulting steam distribution for that cut-off will be the same (see Appendix A), but there will be an important difference in the position of the reverse lever to secure this cut-off. Assume that the lead has been made positive in the usual manner, and the notch in the reverse lever quadrant which gives a 6 in. cut-off is so marked. If the lead is then reduced by the second method, it will be found that the 6-in. notch will give a cut-off of but 4½ in., and the reverse lever must be moved forward to get a 6-in. cut-off. For this reason enginemen will believe they are using a longer cut-off than before the lead was reduced, unless told the facts in the case. If the lead is reduced by the third plan, it will be found that the 6-in. notch will give a cut-off of about 8 in., and the reverse lever must be moved to the central position to secure a cut-off of 6 in. It has been a favorite plan with locomotive runners for a number of years to make their engines "smart" by increasing the lead of the back up eccentric, believing this was warranted by the fact that their engines had greater power than before when working in the same notch. Had they understood that they were lengthening the cut-off by this change in the lead, and that they were using as much or more steam to do the same work, it is quite probable that this adjustment would not be as popular as it is. Because the steam distribution for the running cut-off will be the same so long as the lead is the same, by whatever method the lead is reduced, that one should be used which will give the best results in full gear.

Full Gear Lead.—It is commonly believed that full gear lead is necessary that an engine may be "smart." One engine is smarter than another only when it develops a greater mean effective cylinder pressure or has less internal friction. The difference between the mean effective pressure produced by valves set with $\frac{1}{16}$-in. positive and $\frac{1}{8}$-in. negative lead will be small when the reverse lever is at full gear and will be somewhat larger for the negative lead because of the longer cut-off it gives. Positive lead in full gear blocks an engine to the extent that it admits steam to the cylinder before the piston reaches the end of the stroke. A full gear cut-off is used only for slow speeds, and then the valve opens the port so quickly, the port opening is so wide and the piston travels so slowly that there is no difficulty in securing the maximum pressure in the cylinder as soon as needed, even though a negative lead as great as $\frac{1}{32}$ in. is used. This fact acquires additional importance when it is remembered that the piston which is receiving lead is passing the center, where its power is zero, while the other piston is at half stroke, developing its greatest power and doing all the work. No injurious result will follow if full steam pressure is not secured in the cylinder till the piston has passed the center. In view of these facts it seems evident that full gear lead should be negative instead of positive, to secure the best results, and service experiments demonstrate this to be true, notwithstanding the evidence of those who have not tried it.

Lead and Inside Clearance.—There is no doubt in the minds of many who have carefully tested the matter that considerable inside clearance can be given the valves of high-speed engines with good results, both as to coal economy and speed. Inside clearance will reduce compression by delaying exhaust closure, and in this way reduce the pressure at the point of admission, or lead opening, but will not effect the form of the compression curve after admission. So that, though inside clearance will reduce compression, it will not remove the results of too much lead. Inside clearance not only delays exhaust closure, but hastens exhaust opening, thus decreasing the distance through which the steam is expanded. The loss because of earlier exhaust opening is small when compared with the gain due to a later exhaust closure at high speeds, but this is reversed in freight service. A locomotive which showed a coal economy of 20 per cent. in fast passenger service because of $\frac{3}{16}$ in. inside clearance on each end of the valve showed as great a loss in freight service for the same reason. A reduction of the mid gear lead from $\frac{3}{16}$ in. to $\frac{7}{32}$ in. not only delays the point of exhaust closure $1\frac{1}{16}$ in. (practically the same results as that produced by $\frac{3}{32}$ in. inside clearance on each end of the valve), but also delays the exhaust opening $\frac{3}{4}$ in., a result exactly opposite that of inside clearance, which hastens release. So that a reduction of the mid gear lead not only reduces the inside clearance necessary, but, contrary to the effect of inside clearance, secures a greater expansion of steam, items of importance in any service. Inside clearance is a benefit only on high-speed engines while a correct lead is of advantage to any locomotive. For these reasons the lead should be properly adjusted before giving inside clearance.

Constant or Increasing Lead.—Because of the slow piston speed and wide port opening, a negative lead will give better results than positive when a locomotive is working at full stroke. This is true, because there is abundance of time in which to get full pressure in the cylinder, and the pre-admission of steam acts only to block the piston and lessen the power of the engine. At high speeds and short cut-offs the case is entirely different. Not only is the port opening but a third of that at full gear, but the length of time it is open decreases considerably faster than the speed increases. Taking these facts into consideration, and remembering that the lead is about 85 per cent. of the maximum port opening at 6-in cut-off, it is apparent that the lead should increase as the cut off is shortened for increasing speeds.

Conclusion.—There is a large number of locomotives now running which have too great a lead in the running cut-off. In the opinion of the writer, this is true of a majority of locomotives.

A proper reduction of the lead in the running cut-off will decrease the running repairs and time lost because of engine failures, slightly increase the coal economy and increase the speed capacity of most locomotives.

The proper lead for the running cut-off is the greatest that can be used and secure a full, smooth compression line without a loop at the top.

This can be determined only by the use of an indicator.

Positive lead in full gear is of no advantage so far as the working of a locomotive is concerned, but rather a detriment, nor is any power lost by making it negative within reasonable limits.

Lead is not needed on a locomotive for a cushion at any speed or for any cut-off.

Inside clearance cannot remove the bad effects of too much lead, and should not be given till the lead has been properly adjusted.

Lead should increase as the speed increases. Hence freight engines do not need as much lead in the running cut-off as passenger engines.

The writer would be glad to hear from any one who has, or will, experiment along the lines indicated.

Appendix.—Table of results from full-sized valve model. Maximum valve travel, $5\frac{3}{16}$ in.; outside lap, $\frac{1}{8}$ in.; inside clearance, ?

Full gear lead....	$-\frac{1}{8}$ in. forward motion and back motion.	0 F. M. $-\frac{1}{8}$ in. B. M.	$-\frac{1}{16}$ in. F. M. $+\frac{1}{16}$ in. B. M.
Cut-off.....	6 in.	6 in.	6 in.
Lead for cut-off ..	¼ in.	¼ in.	¼ in.
Valve travel.....	$2\frac{1}{32}$ in.	$2\frac{1}{32}$ in.	$2\frac{1}{32}$ in.
Maximum port opening.....	$\frac{12}{64}$ in.	$\frac{12}{64}$ in.	$\frac{12}{64}$ in.
Occurs in stroke at.....	$\frac{11}{32}$ in.	$\frac{5}{16}$ in.	$\frac{9}{32}$ in.
Exhaust opens at	$16\frac{1}{16}$ in.	$15\frac{13}{16}$ in.	$15\frac{15}{16}$ in.
" opening, maximum.....	$1\frac{6}{32}$ in.	$1\frac{6}{32}$ in.	$1\frac{5}{32}$ in.
Exhaust closes at	$16\frac{1}{16}$ in.	$15\frac{13}{16}$ in.	$15\frac{15}{16}$ in.
Lead opens at.....	$23\frac{5}{16}$ in.	23 in.	$23\frac{1}{16}$ in.

The above gives the steam distribution obtained by reducing the lead in the running cut-off by the first, second and third methods. It is evident that this will be the same for the 6-in. cut-off so long as the lead for that cut-off is the same, no matter by which method the full gear lead was reduced.

PLATTSMOUTH, Nebraska.

The Reading's Single-Driver Express Locomotive.

We have already mentioned the sucessful performance of the Vauclain compound engine with but one pair of drivers recently put in service on the Philadelphia & Reading Railroad. In the latter part of this article we give a description and the principal dimensions of this engine with a brief history of its inception; and it will doubtless be of interest to the reader to know something of what the engine has done and why.

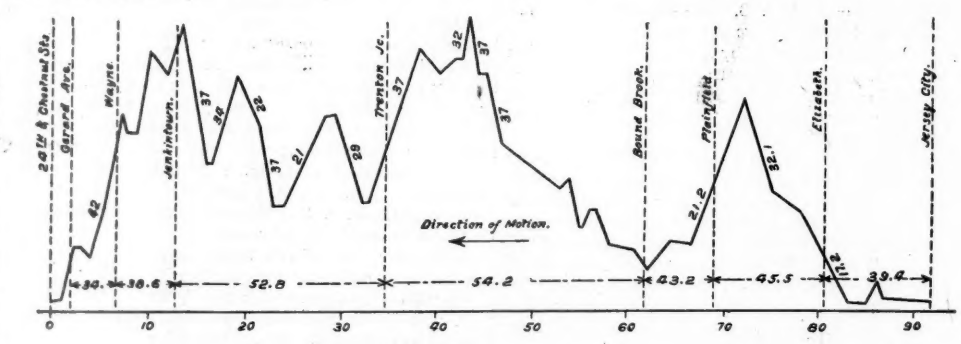
Those who have been skeptical as to the possibility of using single-driver engines on American railroads have had good reasons, for trials have been made before this and none of them sucessfully. In Great Britain and on the Continent the single-driver engines are giving way to two-coupled engines. The announcement of the success of the Reading engine is therefore something of a surprise to those who do not understand the peculiarities of the service in which it is engaged and the particulars of its design.

This locomotive is not without precedent on the Reading road, for there has been running for nearly a year, and during the hard winter weather of last January, one of the "Flying Dutchman" type, with the parallel rods removed, thus making a two-driver (or what is commonly called a "single") engine. This first attempt was an experiment born of the belief that the second pair of drivers is unnecessary and is indeed a hindrance *in this particular service*, as the boiler must be higher, and there is a loss in internal friction and in external friction also if the tires do not wear evenly. After several months of practical trial Mr. L. B. Paxson, Superintendent of Motive Power and Rolling Equipment, consulted with the Baldwin Locomotive Works, with the result that the new two-driver engine was brought out by Mr. Wm. P. Henszey, of the Baldwin works, under the general advice of Mr. Paxson.

Naturally one wishes to know what sort of work this locomotive has been doing, and to this end we have collected some data. A sample of the runs made almost daily is one made July 20 from Jersey City to Wayne Junction. After passing Wayne Junction the running is uncertain, owing to frequent delays. The train was made up as follows: One 8-wheel baggage coach; three 8-wheel passenger coaches; one 12-wheel Pullman parlor car; one 12-wheel Pullman dining car; two 12-wheel Pullman sleeping cars; or 8 vestibule cars, weighing, with the locomotive and tender, 430 tons of 2,000 lbs. The running time is given by the table herewith and the profile of the road is given by the diagram.

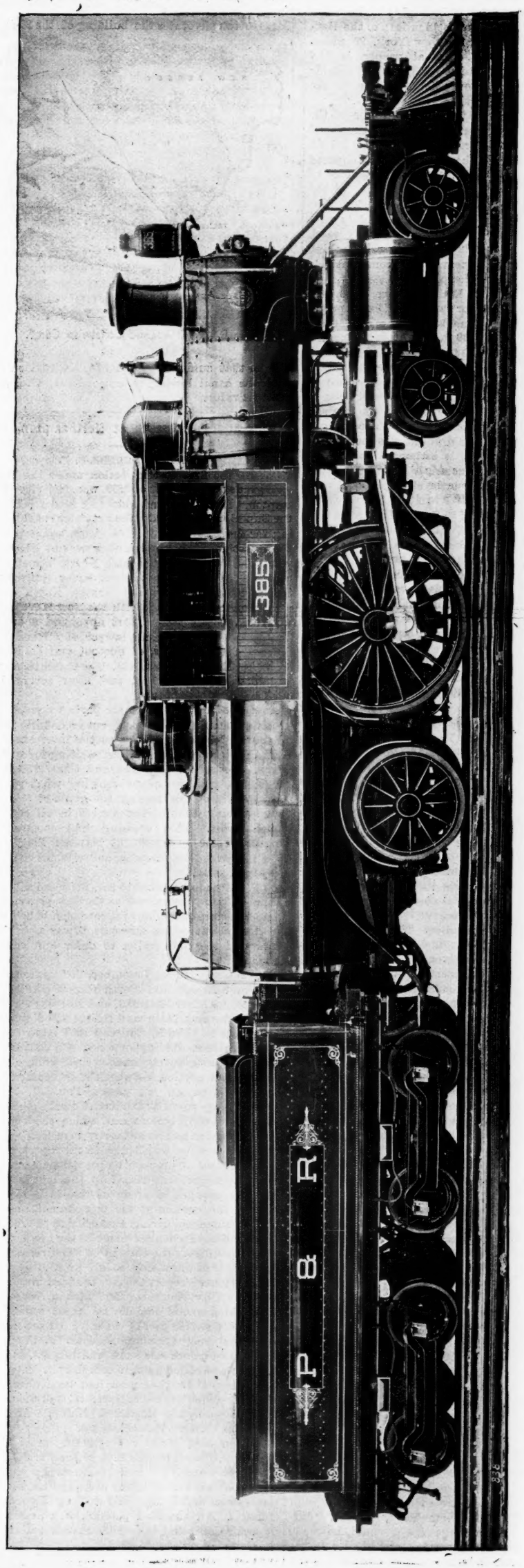
Station.	Distance.	Sch'd.	Arrived.	Left.	Detention.*	Speed miles per hr.	Delays.
Jersey City.....	0	6:12	.....	6:16	4	.....	Held in Jersey City yard.
Elizabeth.....	11.5	6:29	6:33:30	6:34:30	1	39 4	Crossed over on freight track on account of repairing track.
Plainfield.....	23	6:45	6:50	6:51	1	45.5	
Bound Brook.....	30.2	6:56	7:01	7:04	2	43·2	Water at Dunellen.
Trenton Junction.....	51.4	7:27	7:34	7:36	2	51.2	Held by signal at bridge.
Jenkintown.....	79.3	7:55	8:01	8:02	1	52 8	Water at Yardley.
Wayne.....	85.1	8:05	8:11	8:13:30	1½	38 6	Local at Tabor; red outside Wayne.

* There detentions are only those at stations for which no allowance is made on schedule, and do not include the *delays* referred to in last column.



The figures between vertical lines show the average speed in miles per hour between stations, no time allowance being made for delays referred to in last column of statement. Gradient in feet per mile are shown on the profile.

This schedule time is 113 minutes for a run of 85.1 miles with a train of about 380 tons. The performance, as is seen from what precedes, was 430 tons of train in



Single Driver Express Locomotive for the Philadelphia & Reading Railroad.

Built by the BALDWIN LOCOMOTIVE WORKS, *Philadelphia, Pa.*

Mr. L. B. PAXSON, *Supt. Motive Power and Rolling Equipment.*

115 minutes, with several extra stops. There were three flag stops and two station stops; also a stop at Jersey City yards, one by signal at Yardley Bridge, one at Tabor Junction for local train, and one at Wayne Junction by distant signal. The actual extra detentions at stations sum up 7 minutes. Those at other points sum up 7 minutes more, including a crossover to the freight tracks at Elizabeth. The actual equated running time for the 85.1 miles with 430 tons of train, including engine and tender, was therefore 101 minutes, making 10 full stops.

The only places on this run where it was possible to attain any considerable speed were between Bound Brook and Trenton Junction, and Trenton Junction and Jenkintown. Between these points the average speeds from start to stop were 54.2 and 52.8 miles an hour respectively. The maximum up grade is 37 ft. per mile. From Bound Brook to Hopewell the distance is 18 miles and is all uphill. On this grade the locomotive increased the speed of the train from 57 seconds per mile to 51 seconds. No sand was used except at starting from station. The abundance of steam and the large compound cylinders enabled the engine to pull hard at high speed without exhausting the boiler. The grate is so large that an inferior pea coal is used, which costs but 65 cents a ton. So much steam is made by the large firebox, and it is so economically used by the large compound cylinders, that the safety valves blow much of the time on grades. The free steaming of the boiler can be appreciated from the fact that although the exhaust from the low-pressure cylinders cannot be heard above the sound of the injectors and the air-pump exhaust, yet it is sufficient to keep up a full supply of steam for the work on grades.

One purpose of the design is to show that large boilers are unnecessary if the proper ratio is obtained between the grate area and heating surface. This boiler has but 1,460 sq. ft. of heating surface, but, as it is well arranged to take up heat, more steam is made than by boilers having more than 2,000 sq. ft., most of which is in the tubes. The boiler tests on the Paris, Lyons & Mediterranean showed conclusively that it is quite possible to have so much length of tube as to interfere with the total capacity of locomotive boilers when forced. The new Burlington flyer has a large grate and there is a growing tendency in this country to look to the firebox for most of the steaming power and to consider the front of the tubes as acting the part played by a feed-water heater in a stationary boiler plant.

The proportional part of the increased capacity of this locomotive that is due to the Vauclain compound it is impossible to determine, but from the fact that that type of compound on the Jersey Central and the Reading has hauled heavier trains at high speed than the simple engines built to compete with them, and from the fact that the pressure of the exhaust is very low, the effect of the compound action must be considerable. It is estimated by the builder to be 25 to 30 per cent. The builders claim it is no use to try to use hard coal on a small grate and that what is wanted to give the best boiler efficiency is a soft blast such as is furnished by the compound. None of the large grates with single expansion cylinders will burn so well the low grades of fuel that are used by the compounds. The builders claim for this new two-driver locomotive that there is a saving of internal friction of from 10 to 15 per cent., also less repairs, due to the easy action of the larger driver, a lower boiler, 15,000 lbs. less total weight, easier riding and a saving of first cost. The engine is warranted to burn pea or buckwheat coal. It rides easier than the Columbia class, and that class is known to be easier for the engineman than the 8-wheel type.

The engine is undoubtedly fast. One day last weeek we took the time at each mile post for 18 consecutive miles between Jenkintown and Yardley, northbound, with the following result:

Seconds.	Miles per hour.	Seconds.	Miles per hour.
59	61	48	75
54	66 5	46	78.5
47	76.5	51	70.5
53	68	55	65.5
57	63	55	65.5
57	63	57	63
50	72	57	63
49	73.5	50	72
49	73.5	52	69.5

Average.....68.4 miles per hour.

This was with a Royal Blue Line train of five cars. The fastest miles were at the foot of descending grades of about 36 ft. per mile.

The new engine is designated at the Works as of class $8\frac{18}{19}$ ¼ A. An engine quite similar in some ways was built for the Reading by the Baldwin's in 1880 from the patented designs of Mr. W. P. Henszey, of Burnham, Williams & Co., the proprietors of the Baldwin Works. That engine was illustrated and described in the *Railroad Gazette*, May and June, 1880, and in "Recent Locomotives." A great objection to the use of a single-driver engine at that time has now passed away, viz., the lightness of the rails, bridges, etc., and the consequent smaller weight which could be put on the drivers. The weight on drivers of the engine built in 1880 was normally 35,000 lbs., although to assist the engine in starting, a system of equalizing levers was devised by which a larger proportion of the weight was thrown upon the driving wheels, it being again supported by the trailers when the train had got under way. This engine was used on the Bound Brook Division of the Philadelphia & Reading for a short time only, and was afterward taken to England by Mr. Eames, the inventor of the brake known by his name. That engine

was designed to make the run from Philadelphia to New York in two hours.

The new engine, No. 385, weighs about 48,000 lbs. on the driving wheels and 115,000 lbs. in all. The boiler, which is 56 in. in diameter at the smoke-box end, is designed for 200 lbs. working pressure. It is straight-top, and the steam dome is placed back of the cab, over the firebox. This arrangement prevents the surge of the water, in stops, from reaching the dry pipe and gives a freer view forward.

In general the specifications are the Baldwin standard. The throat sheet is ⅛ of an inch thicker than the shell of the boiler to prevent undue thinning where flanged. The material of the boiler is ⅝-in. cast-steel flange plates. All parts are thoroughly stayed, with liners on the inside of the side sheets, providing double thickness of metal for the studs of the expansion braces. There are 324, 1½-in. tubes, with copper ferrules on swaged ends in the firebox tube sheet. The firebox itself is of the Wootten pattern and is 114 in. long and 96 in. wide inside. The side, back and crown sheets are ⅜ in. thick. The flue sheet is ½ in. thick. Staybolts of iron 1 in. in diameter are used, screwed and riveted to the sheet. The crown sheet is supported by inverted "T" crown bars set 2½ in. above the crown. The crown is supported by radial stay-bolts 1⅛ in. in diameter.

The frames of the engine are of hammered iron made in two sections. The four wheels of the front truck are of wrought iron, of the Vauclain pattern, 36 in. in diameter with steel tires. Their journals are 5½ in. in diameter and 10 in. long.

The two 84¼-in. driving wheels have steel centers 78 in. in diameter secured to cast-steel tires, 3⅛ in. thick, by retaining rings. The engine is equipped with the Westinghouse automatic brake on drivers, trailing wheels and tender, 9½ in. air pump being used. The Leach standing device is used, and the engine is also equipped with the P. & R. standard steam heat fixture.

The tender tank is of steel. The top, inside and bottom plates are all ⅜ of an inch thick, riveted with ⅝-in. rivets, 1¼ in. pitch. The capacity of the tank is 4,000 gals., and it is provided with a water scoop. The tender frame is built of 8-in. iron channels strongly braced. There are two 4-wheel center bearing trucks with class "B" Boies wheels 36 in. in diameter. Brakes are provided for both trucks. The axles are of steel with outside journals 4½ in. in diameter and 8 in. long.

The principal dimensions of this engine follow:

Description.

Type	One pair of drivers and 4-wheel rigid truck.
Name or number	385
Name of builder	Baldwin Locomotive Works.
Name of operating road	Philadelphia & Reading.
Gage	4 ft. 8½ in.
Simple or compound	Compound.
Kind of fuel to be used	Fine anthracite.
Weight on drivers	48,000 lbs.
" " truck wheels	39,000 lbs.; trailer, 28,000
" total	115,000 lbs.

General Dimensions.

Wheel base, total, of engine	22 ft. 9 in.
" " rigid	7 ft.
" " total (engine and tender)	50 ft.
Height of stack above rails	14 ft. 3 in.

Wheels and Journals.

Drivers, number	2
" diameter	84¼ in.
" material of centers	steel turned to 78 in. diam.
Truck wheels, diameter	36 in.
Journals, driving axle, size	8½ in. diam., 12 in. long
" truck " "	5½ in. diam., 10 in. long
" trailer " "	7 in. diam., 12 in. long
Trailer wheels, cast steel center, steel tire	54¼ in. diam.

Cylinders.

Cylinders, diameter	H. P. 13 in., L. P. 22 in.
Piston, stroke	26 in.
Valves, kind of	piston, 11½ in. diam.

Boiler.

Boiler, working steam pressure	200 lbs.
" material in barrel	Homogeneous cast steel
" thickness of material in barrel	⅝ in.
" diameter at smokebox end	56 in.
Seams, kind of horizontal	Butt joint
" circumferential	Double riveted
Thickness, crown sheet	⅜ in.
Crown sheet supported by	Inverted T crown bars
Heating surface	1,460 sq. ft.

Tubes.

Tubes, number	324
" material	No. 13 W. G. iron
" diameter	1½ in.
" length	10 ft. 3 in.

Firebox.

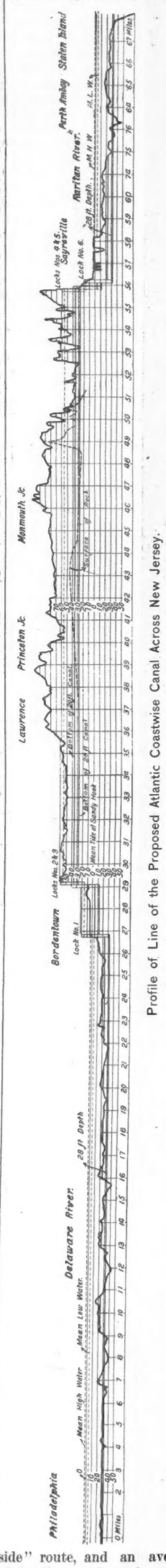
Firebox, Wootten, length	114 in
" width, inside	96 "
" material	Homogeneous cast steel
" thickness of sheets, side and back	⅜ in.
" water space, width: Front, 3½ in.; sides, 3½ in.; back, 3½ in.	
Grate, kind of	Water tubes and bars

Other parts.

Smokebox	Short netting set vertically
Stack	Straight, with cast-iron top and steel base
Feed-water injectors:	Two Sellers, 1887; No. 10½, on right side

The Atlantic Coastwise Canal Across New Jersey.

The Canal Commission of Philadelphia, in its report to the Select and Common Councils of the city (just issued) describes the well-known scheme of a canal across New Jersey, giving plans, estimates of cost, etc. The report of N. H. Hutton, Consulting Engineer, treats the subject in a way to give one a comprehensive view of it in little space. Two routes have been surveyed, one of which presents such difficulties to construction as to make it undesirable; the other ascends the plateau on the left bank of the Delaware, leaving that river near Bordentown, follows a line southeast of and nearly parallel to the Pennsylvania Railroad to a point near Monmouth Junction, where it deflects to the east. From here it passes down the valley of Lawrence brook to Parsons' dam, a long pool, thence to the Raritan River at Sayreville. The total distance from Philadelphia to the ocean near Sandy Hook by this route is 78 miles; to the Battery, New York, 92 miles. The canal proper is 31.4 miles long. The outside route is 274 miles to the Battery.



Profile of Line of the Proposed Atlantic Coastwise Canal Across New Jersey.

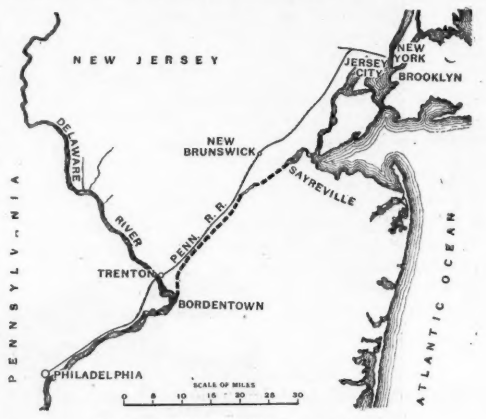
The proposed line of the canal lies in a topographical trough, from 60 to 100 ft. above sea level, as compared with general elevations of from 200 to 300 ft. of the country on either side. The surface is moderately rolling, the soil mainly sand, clay and gravel, making excavation comparatively cheap.

Estimates are submitted for two sizes of canal prism, one, 96 ft. wide at bottom, 150 ft. wide at water surface, 20 ft. deep in center, for vessels not exceeding 18 ft. draught; the other, 100 ft. at bottom, 184 ft. wide at water surface, 28 ft. deep, for vessels not exceeding 26 ft. draught. In both cases it is estimated to have on one side a berm 12 ft. wide. One level is proposed from river to river at an elevation of 56 ft. above mean sea level at Sandy Hook, or 60 ft. above mean low water in the Delaware near Bordentown. Both projects contemplate reaching this level by three locks, of 20 ft. lift each, at either end of the canal. It is proposed to economize water and time by the use of two sizes of locks for the 20-ft. deep canal, and an additional one, making three locks abreast for the 28-ft. canal.

Throughout the canal, the slopes are taken at a ratio of 1½ to 1, with banks below water protected by stone pitching. The locks are to be founded on piles with timber grillage, etc., the masonry to consist of ashlar with rubber backing. The gates will be of steel. Electric lighting for the locks and canal is also proposed and included in the estimates. These also include a dam on the Delaware River, for an impounding reservoir, and the enlargement of the present Delaware & Raritan canal feeder. The estimate for the 20-ft. canal is $14,574,100; for the 28-ft. canal, $24,124,700.

It has been ascertained beyond doubt that the water supply from the Delaware is ample for the canal, making allowances for evaporation, etc., and for a larger business than can reasonably be expected. The probable business is estimated at 5,000,000 tons a year, an increase of 2,000,000 over a years' record for the present Delaware & Raritan canal. This is for coastwise traffic, the canal not being designed for transatlantic commerce. This traffic must be charged 5 cents per ton, to cover operating expenses ($250,000). To pay 5 per cent. on the cost of a 20-ft. canal, 15 cents per ton; to pay 5 per cent. on a 28-ft. canal, 25 cents, which would make the tolls for the two canals 20 and 30 cents per ton respectively. Under the assumption that the ordinary coastwise trader would average 10 miles, between Philadelphia and New York, by the "outside" route, and an average speed could be made of 7 miles per hour in approaches and 5 miles in the canal, and that two hours would be consumed by lockages in the canal, there would be a saving on each trip of about 10½ or 11 hours, or nearly a day in a round trip.

Mr. Hutton advocates the building of the 28-ft. canal,



Route of Atlantic Coastwise Canal.

in order that sufficient depth may be provided for war ships, the canal having, in case of war, a considerable strategic value.

Separation of Grades at Northampton, Mass.

BY E. K. TURNER, C. E.

Among the first to take action under the Massachusetts grade crossing law of 1890 was the city of Northampton. Its mayor and aldermen filed a petition with the Superior Court, under the provisions of this law, asking for the appointment of a Commission to consider the question of separation of grades at Pleasant, Holyoke, Main and Bridge and North streets at their crossings with the Connecticut River Railroad, and of South, Pleasant, Main and Bridge, North and King streets at their crossings with the New Haven & Northampton. The Superior Court appointed a commission composed of S. O. Lamb, lawyer, of Greenfield; E. K. Turner, Civil Engineer, of Boston, and L. R. Norton, Bank President, of Westfield. The Commission met and organized March 14, 1891, and after several hearings filed a report Dec. 31, 1891.

At the earlier hearings all parties agreed that the crossings should be abolished, but no definite plans were presented by either of the parties interested and considerable delay was experienced waiting for surveys and plans. Messrs A. W. Locke and Chas. A. Allen, Civil Engineers, prepared plans showing what the city desired, providing for raising the grade of the railroads and lowering that of the streets in all cases except South street. This crossing had meanwhile been changed under an agreement between the city and the New Haven & Northampton, and was not considered by the commission.

The railroads objected to the proposed raising of the grade of their tracks, and as the law provided that no change in the grade of any railroad should be made without the consent of its directors, it was not within the powers of the commission to order and enforce such change.

The report filed in December, 1891, ordered Pleasant, Main and Bridge and North streets carried over the Connecticut River Railroad, and Holyoke street discontinued; Pleasant, Main and Bridge and North streets to go over the N. H. & N. Railroad and King street under it. This report also apportioned the cost between the commonwealth, the city and the railroads, and divided the railroad portion between the two companies, in accordance with an act passed Feb. 27, 1891. This report was approved by the court in all except the discontinuance of Holyoke street, which the court decided the commission had no authority to order.

The city was not satisfied with the report, and at once took measures to prevent its provisions from being carried out. An act was passed by the legislature forbidding any changes in grade of streets in Northampton without the consent of the city council, and the act of 1890 was amended, giving authority to the railroad commission to have changes made in the grade of railroads without requiring the consent of the directors.

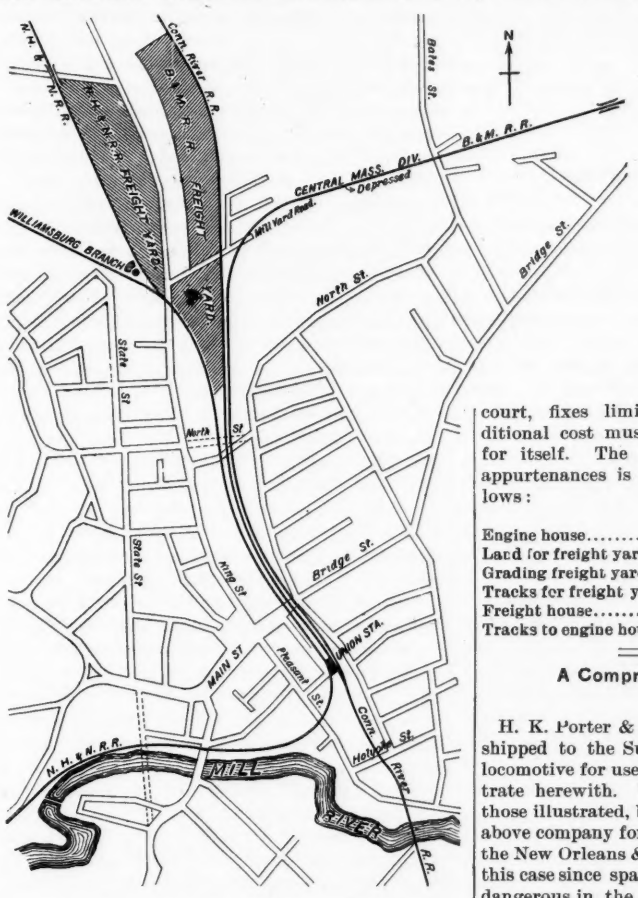
Having thus put a stop to all proceedings under the Commissioner's report the city retained Mr. Locke, who, with the City Engineer, Mr. Strong, began work on plans which should include all grade crossings within the thickly settled part of the city, and provide new passenger and freight accommodations. Both of these gentlemen died before this work was finished, and Mr. Chas. A. Allen was called upon to complete it. Meanwhile the New Haven & Northampton had been absorbed by the New York, New Haven & Hartford, and the Connecticut River leased by the Boston & Maine, which had also leased the Central Massachusetts.

The engineers, Mr. F. S. Curtis for the N. Y., N. H. & H., Mr. N. Bissell for the B. & M., and Mr. Allen for the city, agreed upon the main features of a plan, comprising the streets named in the first petition, together with Bates street and Bridge road crossing the Central Massachusetts. An amended petition was presented to the Superior Court and the whole matter referred back to the Commission Dec. 15, 1894.

At an early stage in the hearing called by the Commission, it was found that no authority was given by laws

then existing, either for the Commission to order the things agreed upon by the parties, outside of changes at crossings, such as new freight accommodations, union station and other passenger accommodations, nor for the payment of part of the cost of such accommodations by the state or city. Proceedings were again interrupted to give time to apply to the legislature for relief. An act was passed in April, 1895, giving authority to the Commission to order such changes as it considered necessary and to apportion the cost between the state, city and three railroads interested. The second report was filed with the Court in June, 1895, and approved in full July 12.

The changes ordered provide for raising the tracks of the Connecticut River track from a point 2,400 ft. southerly from Pleasant street crossing to a point north of Mill Yard road, for raising the tracks of the N. H. & N. from a point 2,100 ft. westerly from Pleasant street to points just north of the junction of the main line and Williamsburg branches. The grade of tracks of the Central Massachusetts is to be lowered from the westerly end of the bridge over the Connecticut River to a point 900 ft. west of Bates street and raised from that point to its junction with the Connecticut River. This depression of the C. M. tracks is the one depression of tracks throughout the work.



Railroad Improvements at Northampton, Mass.

The grade of all streets is lowered, except that of Bates street, which is carried over the Central Massachusetts. The amount by which the grade is changed at the various crossings is as follows:

Raised	Conn. R. R. R.	7½ ft.		Conn. R. R. R. N. H. & N. R. R.	12½ ft.
Lowered	Pleasant st.	7 "		Main and Bridge sts.	3 "
Raised	Conn. R. R. R. N. H. & N. R. R.	10 "		N. H. & N. R. R.	10½ "
Lowered	North st.	4½ "		Pleasant st.	4 "
Raised	N. H. & N. R. R.	3 "		Bates st.	1½ "
Lowered	King st.	12½ "		Cent. Mass. R. R.	4½ "
Raised	Cent. Mass. R. R.	0 "		Conn. R. R. R.	10½ "
Lowered	Bridge road	14 "		Holyoke st.	4 "

Mill Yard road, a private way crossing the tracks of the Connecticut River and Central Massachusetts railroads is discontinued and another way ordered built to North street in substitution. North street is changed to give a better angle of crossing for the bridge under the railroads and easier approaches. The Connecticut River railroad bridge over Mill river will be raised to conform to the new grade, requiring a new abutment and pier. The railroads will be carried over the streets on steel or iron bridges on granite abutments. Granite retaining walls will be built wherever needed, to prevent injury to adjoining property.

A passenger station will be built between the tracks of the Connecticut River and those of the N. H. & N., the northerly end of the station to be not over 490 ft. from the southerly side of Main and Bridge streets. A covered platform is to extend from the station to the streets between the railroads, with steps from the side walks to the platforms. A covered passageway under the tracks, from Strong avenue, just north of the station, with steps to the station and platforms, will also provide access for foot passengers. Driveways for carriages will lead to the paved yard south of the station from both Pleasant and Holyoke streets. This yard will be at the same grade as the tracks.

Land for freight yards has been taken at the north end of the city in area sufficient for a considerable increase over the present amount of business. In these yards will be laid tracks aggregating about 20,000 ft. in length for each of the Connecticut River and the N. H. & N. railroads. Grading enough for these tracks and approaches to them will be done at present. Freight houses and platforms for each railroad will be built in the yards, it being intended to remove local as well as interchange freight to the new location. An engine house for each railroad will be built near the south end of the yards with tracks, water columns and drains. The present freight house and yard of the Connecticut River road is south of the passenger station, there being tracks on both sides of the main line. The freight station of the New Haven & Northampton is north of Main street, with some side tracks west of Pleasant street.

The Connecticut River is ordered to do all the work on its line and on the Central Massachusetts and that portion of the N. H. & N. between Pleasant street and the north side of North street. The N. H. & N. to do the work on its line outside of the points above noted. The Connecticut River is to build the passenger station upon its land and own it.

The total cost will be borne as follows: 25 per cent. by the commonwealth, 10 per cent. by the city, and 65 per cent. by the railroads. The 65 per cent. being divided among the railroads as nearly as possible in proportion to the work to be done on each. On all of the expenditures outside of those directly connected with the crossing changes, the report of the Commission, approved by the court, fixes limits. If these are exceeded the additional cost must be borne by each railroad company for itself. The limit for the passenger station and appurtenances is $80,000. The other items are as follows:

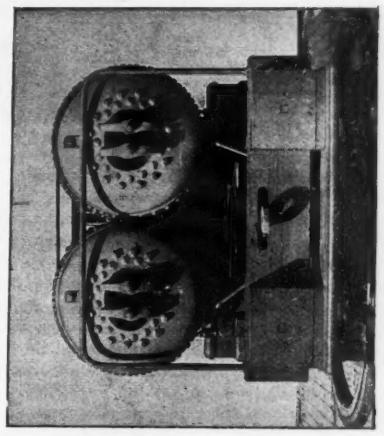
	Conn. Riv.	N. H. & N.
Engine house	$17,000	$9,000
Land for freight yard	25,000	43,000
Grading freight yard	20,000	25,000
Tracks for freight yard	24,000	24,000
Freight house	7,000	6,000
Tracks to engine house	4,000	.....

A Compressed Air Mine Locomotive.

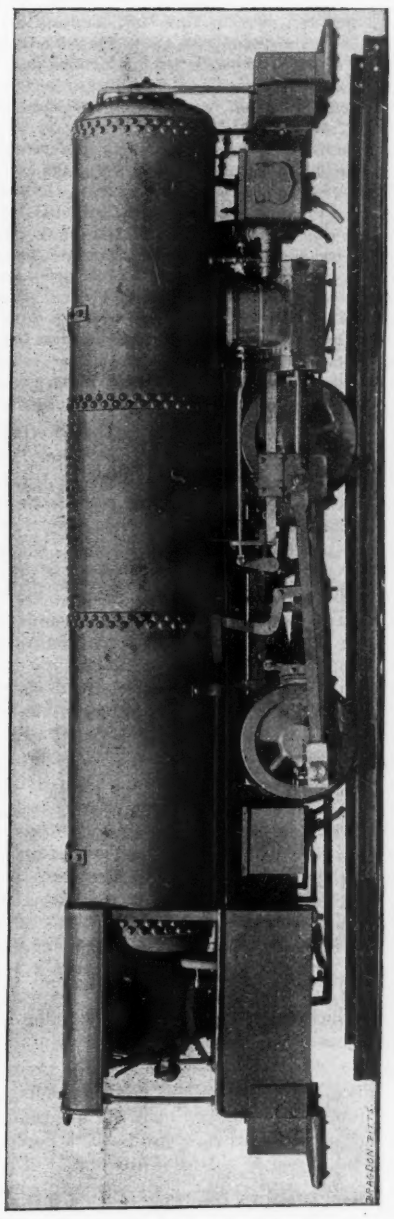
H. K. Porter & Co., of Pittsburgh, Pa., have recently shipped to the Susquehanna Coal Co. a compressed air locomotive for use in one of their shafts, which we illustrate herewith. Two machines, somewhat similar to those illustrated, but larger, are now being built by the above company for use in the cotton sheds and yards of the New Orleans & Western Railroad. They are used in this case since sparks from steam locomotives would be dangerous in the neighborhood of so much cotton and other inflammable material. Some of their advantages for mine use are as follows: Their shape, as is seen from the illustration, presents no projections which would obstruct the entrance of the locomotive into a small shaft. The locomotive, being self-contained, can be run anywhere that tracks are laid. Steep grades and sharp curves are practicable. Further, the working parts are few in number and the result is that the engines are simple, easy of operation and durable Their low cost of installation and operation is also an important advantage, while the absence of cinders, sparks, etc., is desirable in almost any service. The supply of fresh air which is given off by these engines is especially valuable in mine service.

The dimensions of the locomotive are about as follows: It is 17 ft. 6¾ in. long, 5 ft. 2 in. wide and 5 ft. high. The illustration showing a rear view, gives an idea of the small size of opening required for entrance by this locomotive. Its weight is 18,500 lbs.; the cylinders are 17 in. × 14 in., and a working pressure of 600 lbs. per square inch of air in the tanks is used. As is seen from the side view, there are 4 drivers 24 in. in diameter, and two air tanks whose total capacity is 130 cubic ft. An auxiliary reservoir is provided and a reducing valve for delivering the air to the cylinders at 100 to 140 lbs. pressure, variable instantly as desired. The tank heads are convex outward and the circumferential seams of the tanks are double riveted, with manholes in the front heads, as is clearly seen from the illustration showing a front view. The horizontal seams are treble riveted. The tanks were tested at 900 lbs. pressure per square inch before using.

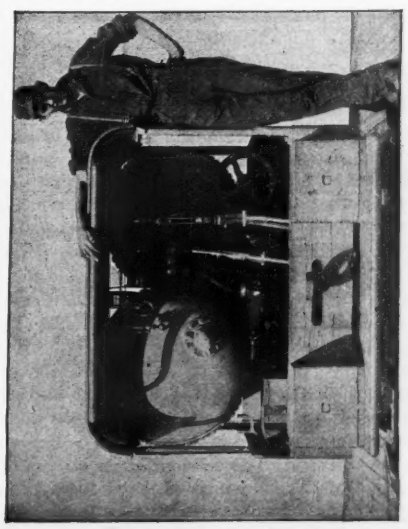
A powerful hand screw brake is provided, braking each of the four driving wheels. The axles, crank-pins, rods, crossheads, guides and links are all of steel, and hardened removable bushings and pins are provided throughout for all valve gear. Sand boxes are provided to sand all wheels both ways. All operating levers, valves, etc., are within easy reach of the engineer. The locomotive is designed throughout to secure the best efficiency for uninterrupted work for long hours under severe conditions, and the design of parts is such as to make repairs easy.



Front View.



A Compressed-Air Mine Locomotive—By Messrs. H. K. Porter & Co.



Rear View.

RAILROAD GAZETTE

ESTABLISHED IN APRIL, 1856.

Published Every Friday

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EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

The commissioners of the great suspension bridge to be built across the East River between New York and Brooklyn have chosen Mr. L. L. Buck as their chief engineer, after long consideration and from among many applicants, and we venture to say that even those who were disappointed will be unanimous in saying that the choice is a good one. Probably each applicant would have said to the Commission, "If you cannot choose me, the best man on the list is Buck." Certainly Mr. Buck's professional qualifications are of the highest. His achievement in renewing the railroad suspension bridge at Niagara Falls is part of the glorious history of the profession, and his long subsequent experience as engineer to the company owning that bridge has given him an education which no other living man has had in watching a suspension bridge under heavy railroad traffic. Indeed, there are those who say that Mr. Buck is to-day the first living authority on suspension bridges, and very likely this is no exaggeration. In character he is a man of resolution and of old-fashioned integrity, and we often think of him as one of Plutarch's men." The whole engineering profession ought to rejoice that this great work is to be in such hands, and all of Mr. Buck's friends will be glad that he has such an opportunity to build a fit monument to his modest, patient and useful life.

Last Tuesday morning the newspapers of several cities published columns, more or less, under such headings as "an industrial combine," "a combination of millions," "big industries in alliance," "great companies unite," and so on. The reader who sought for the truth and who had some skill in separating fact from fancy, and was patient about it, was able to disentangle the one fact—that the Baldwin Locomotive Works and the Westinghouse Electric & Manufacturing Company had entered into an agreement concern their policy in building electric locomotives. The simple fact is that these two companies have made an arrangement, under which they will unite in developing electric motors suitable for railroad work. The resources of both establishments will be utilized in design, experiment and determination of standards, in general and in detail. Further than that, orders which may be secured for engines of this description will be divided, each works doing that part for which it is fitted by plant, skill and experience. In order to carry on this work harmoniously it must naturally be co-ordinated by some one man, and we are informed that Mr. David L. Barnes has been selected as joint engineer, or joint consulting engineer, or something of that sort. We are not sure that any title has been determined upon or that any strict limit has been set upon his duties or functions. This, so far as we can ascertain, is the whole story. The movement is an eminently logical one, and is one which we have foreseen for a good while and advocated at times. In fact, the arrangement between the Baldwin Works and the Westinghouse Company is not very different on the face of it from what the Schenectady Works and the General Electric have been doing for some time, although the union may be more intimate and "binding." It is an obvious waste of energy for the electric works to build frames, running gear and all that part of motors and electric locomotives, which the locomotive works are especially qualified to do, and which they are likely to do a great deal better than any one, however skillful, coming new into the field. On the other hand, it would be an obvious waste of energy for locomotive works to put in additional plant and the additional staff necessary to make the strictly electrical equipment for such machines. Therefore, combinations such as have been made between the Baldwin and Westinghouse companies are in the direction of economy of energy, and for the interest of the parties immediately concerned, and of the great public. We question if the principal officers and members of either of the companies entering into this arrangement expect to do a business great in magnitude or revolutionary in character in the way of building electric locomotives; but we apprehend that they propose to go on and develop the business on scientific and rational lines for all that it is worth.

A Failing Case in Station Design.

We approach with some diffidence the consideration of what has appeared to us a common error in the design of the larger stations in the United States, and an error seldom seen in the stations of Great Britain and the continent of Europe. Great skill and intelligence have been expended by engineers and architects in making beautiful and stately and commodious stations—or in trying to—and one must stand amazed at the ingenuity which they show in destroying the comfort of those who wait, and in obstructing the free flow at the stations of the stream of outgoing passengers. And yet these results are achieved by such simple means! But that is where the skill is shown; that is what has made American station design famous, not to say notorious. The simplicity of the devices is marvelous.

First we mass all passengers in one vast hall, and put here the ticket offices, telegraph office, newsstand, chewing gum merchant and half-a-dozen other utilities or nuisances. We fill this hall with benches, and into it we turn the much-enduring American crowd. Those who must wait sit on hard benches and gaze at the splendors of gilt and plaster and what many of them call "paper mash." Those who go directly to the trains—far the greatest number of the users of any large station—wind their way among benches and bundles and human feet and escape through narrow doors to the intermediate platform. Here the crowd spreads out and takes breath, to be again slowly dribbled through narrow gates to the train platforms. Such are the simple means by which able designers have made the American station a byword and a scoffing to the well-informed.

The eel who has become thoroughly used to being skinned considers skining the natural lot of eels and stops wriggling. The skinner whose skill in skinning has been often admired thinks he has done a fine thing and does not even suspect that he has been cruel, to say nothing of having been cruel gratuitously. By way of giving the eel and the eel-skinner some better notions of their mutual relations we will take up a few actual examples, and as we must begin somewhere will begin at New York.

We do not think of a single station in New York where all the passengers are not passed through the waiting-room as if it were the air lock through which one must go to get into a caisson, and in New York the ferries introduce a special complication. The passengers arriving at the ferry entrance are all choked through one narrow, little passage, barely broad enough to permit two people to pass at a time. In rare instances there are two of these. Then they accumulate in a waiting-room from which they are finally released, to again crowd through gates which are larger than the ferry wickets, but still too small for the crowds by which they pass to the ferryboats. Arrived on the west side of the river the ferryboat crowds are again throttled down to one or two doorways, leading into a great waiting-room. Through this waiting-room they pass, and are wiredrawn through narrow doors leading out into the train shed where they are again bunched for a greater or less time on the head platform and finally permitted to pass through other gates leading out to the train platforms. The whole arrangement is grotesque in its inconvenience and complication. It is a vestige of the notion that all tickets must be inspected before the passengers reach the trains. As a matter of fact, all tickets are not inspected, and without employing more men than the railroads are willing to employ, or could afford to employ for this purpose they cannot be inspected, and the custom has become a superstition.

It is only just to say that the Central of New Jersey has, on the west side of the river, arrangements which are beyond criticism so far as concerns outgoing passengers only. There is a broad hall by which passengers can go from the boats directly to the train shed; and the gates to the train platforms are broad and unobstructed.

To improve the ferry entrances is not very easy; it could only be done by acquiring more space and employing more men. But the ferry entrances are not so very bad, because the people arrive there gradually, and so, although the crowds that push through the ferry wickets are often disagreeable, they are seldom great. The distribution of the passengers from the ferry waiting-rooms to the ferryboats could not be improved much unless more boats were run, which, of course, opens up an entirely different set of considerations; although, so far as we have observed, it would be quite practicable to open wider the gates leading from the waiting-rooms to the boats, and this is rather important because we would have to deal with a great crowd slowly accumulated and suddenly released. But the arrangement on the west side of the river is quite unnecessary. Wire-drawing the crowds through three sets of narrow passages and locking them through an obstructed waiting-room is a surprising example of want of ingenuity on the one side and patient, dull endurance on the other.

The theory that all this is done in order that tickets may be inspected is quite falacious. It is a fact that tickets are inspected at some of the stations for express trains, but there is no pretense of inspection for most of the trains, and in the busy hours complete inspection would be impracticable.

But the worst station in New York is the Grand Central Station occupied by the New York Central and the New York, New Haven & Hartford. The condition there is principally the result of strict physical limitations. The old station building is entirely too small for the business to be done. We find here long, narrow waiting-rooms, cheerless in the extreme. Through these waiting-rooms the ceaseless throngs pour, circling around the benches and posts and booths and counters, and here they must buy their tickets, get their information and transact all the business that one has to do at a station except actually checking baggage. They can emerge from these dens only through doors which are kept locked until a few minutes before the departure of the trains. Then the crowds are squeezed down and trickled through the doors to allow the doormen to examine and punch their tickets. Arrived in the train shed they are shunted off to the various train platforms, and, in the case of the Harlem division, made to walk from 500 to 1,000 ft. more than ought to be necessary. Trains are not started for a full minute after the doors are closed, so long is the average foot journey. The situation cannot be greatly improved until a new station is built or the old one so far remodelled as to amount to a practical re-building, but some improvement could be made by knocking holes in the walls and letting the passengers flow out and distribute themselves along the head platform and then opening the gates to the train platforms as soon as the trains are made up. Even the removal of the iron railings, so as to make available the whole of the openings already existing would greatly ameliorate the conditions when the crowds are usually large. This would get the people out of the way gradually and would prevent the most serious congestions which take place now. More ticket windows should be provided also for the great traffic passing through this station, and if there is not room for them in the waiting-rooms they could be easily arranged to open on the head platform in the train shed.

Two of the most important examples of new terminal stations are those of the Pennsylvania Railroad and the Reading in Philadelphia, and here we see repeated the same old idea of sending the passengers through the main waiting-room. These two stations suffer from the additional and unavoidable difficulty of high-level termini. The train level is considerably above the street level, so that entrance to the train shed must be effected by stairs. The Reading has provided two large flights by which passengers can reach the train shed without going through the waiting-room at all, and so far as concerns the comfort of departing passengers, this arrangement would seem to be adequate. It does not, however, protect waiting passengers, because it is a fact that during the crowded hours great throngs climb a staircase with two turns, up to the waiting-room, and then pass through a portion of the waiting-room obstructed by benches, radiators and people's feet, to their own discomfort and that of the people waiting. Here, as in the Pennsylvania station, elevators are provided, but

of course these cannot accommodate the crowd in rush hours.

At the Pennsylvania station the staircases leading to the waiting-room are very fine and entirely adequate. The only criticism is that they open immediately into the center of the waiting-room. But here also is provided a staircase leading from the sidewalk directly to the train shed for the use of those who choose to go that way. On the whole, this part of the arrangement of these two stations is not bad for passengers who are going directly through, but it is fundamentally bad for those who need to wait. Of course, women's waiting-rooms are provided which are quiet, comfortable and cheerful.

In both of these stations there is free egress from the waiting-rooms to the head platform, and this platform itself is spacious. Passengers accumulating here, however, must pass through wickets leading out to the train platforms for the nominal purpose of having their tickets inspected. These wickets are so narrow that but one person can pass at a time. The gates are opened nominally 10 minutes before the departure of the train; but in fact one will often see considerable crowds collected for a given train and shunted through these narrow wickets with much jostling and discomfort. Inspection at the wickets is impracticable in the very busy hours, and there is no pretense of making it, except for express trains, to provide that passengers destined for stations at which those trains do not stop do not go aboard. This inspection, when it can be carried out, serves other useful purposes, such as preventing passengers from boarding trains for other destinations than those which they are bound for, and preventing passengers with Reading tickets going aboard the Pennsylvania trains. The inspection does not, however, go far enough to prevent passengers getting on board the trains with no tickets; that is, it does not, because as we said before, it is impracticable to make any inspection during the very busy hours. On the whole, at these stations as elsewhere it would seem to be the best plan to throw the gates from the head platform to the train platforms wide open as soon as the trains are made up, and do away with any pretense of inspection of tickets, except at those hours when the principal express trains are departing, and when it can be done without inconvenience to the great mass of commuters and suburban passengers.

In Boston some good examples of station design are found. The new Union Depot being the latest is naturally the most ample and the best arranged. Here is a broad, free passage way, with a number of ticket windows, and broad doors to the head platform. One can go through here without passing through the waiting-room, or, if he has occasion to wait or for any reason prefers it, he can go through the waiting-room and find there several ticket windows opening into the same office, which serves the passageway of which we have spoken above. Leading out of the waiting-room are ample, broad doors, opening directly on the head platform, on the same level, and there is no ticket inspection. This head platform is in itself very spacious. The ticket office occupies a commanding position, such that it can serve the waiting-room, the passageway and the hall between the two, there being windows enough to allow classification between the various kinds of travelers, as, for instance, suburban, local, through, etc., and there appear to be ticket sellers enough in this office to serve the public promptly. In this station one will find also a great covered court for cabs, reminding him of the large English stations.

The Providence station of the New York, New Haven & Hartford, although not new, is also well arranged for the convenience of passengers. Here is a great hall, leading directly from the street to the train shed. It is broad, unobstructed by benches or booths, and has ample doorways. Opening off the hall are the waiting-rooms. The ticket-office has several windows on this hall, so that passengers can procure tickets without going into the waiting-rooms, and can pass directly out to the train shed. In the train shed there is a large platform with the customary railing and gates, shutting off the train platforms, but these gates are open perhaps 15 minutes before the departure of trains, so that the passengers can distribute themselves to their proper trains gradually and comfortably.

Indeed the Boston & Albany station, although gloomy, is better arranged than the ordinary, grand new station. It embodies the same principle of a large hall, giving perfectly unobstructed passage from the street to the train shed.

We need not go further in our examination of individual stations. The one system of making the waiting-room a common hall for those who wait, for those who rush through, and for the transaction of various business, is typical of the great American station. Even the vast new Union Station at St. Louis, the latest and one of the costliest, has this feature. It is true that a vast and beautiful and very expensive room has been provided on a higher level than the ticket-office and train shed but we are told that this is little used.

What are the controlling principles in the design of this part of a railroad station, and how are they to be met?

In the large cities and towns a very important part of those who pass through the stations do not even stop to buy tickets. In many cities this class is a large majority of the passengers. In the large towns the great majority of passengers know precisely where they are going and what they want, and have not long to wait about a station. It is for this great majority that the stations should be primarily designed. Then there is the class who know what they want and have a little waiting to do. This class also must be considered. Finally, there are those who need advice, much the smallest part of the whole mass of people to be handled. And yet the stations seem to be designed primarily for this fraction of one per cent., on the theory that somebody should see face to face, every passenger who goes through the station and see his ticket. Obviously nobody does this, and in the great city stations it would be impossible to do it, and the whole theory falls to the ground. The small, ignorant class could be cheaper and more efficiently attended to by special men than by building the great stations with regard to them.

The ideal station, then, would have a sufficient and unobstructed passageway from the street to the train shed. Opening on this would be ticket windows enough to serve promptly the normal traffic, and spare windows that could be opened and manned for special occasions. The waiting-rooms should be not too large, several in number, clean, bright and comfortable, with tables on which one could write, and easy chairs. As we do not have classes, it might be practicable to charge a small fee for the use of waiting-rooms that are kept especially clean and fresh. This sort of an arrangement would make it possible to wait in peace and quietness, and actually to rest, at a station, and it would save the great mass of those who use the stations from a series of annoyances which, when repeated day by day and year by year, become wearisome, not to say exasperating.

Singularly enough the plan which we propose is not even original; it is general elsewhere than in our own country. It would be interesting to trace the growth of the fashion of the American grand station, but we need not stop to do that now. We are inclined to believe that our national vanity has had a good deal to do with it; and at any rate the result is uncivilized.

Annual Reports.

Chicago & Northwestern.—The annual report of the Chicago & Northwestern Railway Company for the 36th fiscal year is to May 31, 1895. The principal results of operation are as follows:

	1895.	1894.	Inc. or Dec. per cent.
Mileage	5,031	4,811	
Earnings, passenger	$7,044,691	$9,226,467	−23.65
" freight	19,484,415	21,284,929	− 8.46
Express and mail	1,297,716	1,186,249	+ 9.−
Miscellaneous	281,552	288,538	− 3.−
Total	$28,108,374	$31,986,183	− 2.12
Operating expenses	$17,503,917	$19,867,628	−11.9
Taxes	1,007,811	1,040,302	− 3.12
Net interest on bonds	6 663,767	6,443.553	+ 3 42
Sinking funds	325,830	327,150	− 0.4
Net revenue	2,851,956	4,307,544	−33.79

The average mileage, it will be noticed, was somewhat increased, due to the fact that in 1894 the Milwaukee, Lake Shore & Western operations were included for only nine months. This of course impairs somewhat the value of the comparisons.

As would naturally have been expected, the greatest decrease was in passenger traffic. The falling off here was equal to 56.26 per cent. of the total loss which the company sustained on all of its traffic. The decrease from first-class passengers was only 7.56 per cent., or $404,257. In round trip and excursion travel the decrease amounted to $1,675,079, or 64 per cent. On commutation travel the earnings fell off almost $100,000, or 8.34 per cent. It is hardly necessary to point out that a very large part of this decrease is due to the loss of the World's Fair travel and therefore is entirely abnormal. The number of passengers carried fell off 11.5 per cent.; the passenger rate rose from 1.95 cents per mile to 2.7 cents and the average distance declined 5.24 miles.

The decrease in freight earnings, namely, 8.46 per cent., was in spite of an increase of 6.75 per cent. in tons of freight carried. The increase was chiefly from carrying iron ore tonnage, naturally taken at very low rates. Moreover, the ton miles fell off 13.86 per cent., owing to the much shorter haul, the decrease in the haul having been 30 miles, or 19.48 per cent. The rate per ton-mile was 1.15 cents; the year before it had been 1.08.

Of course everybody will remember that the year covered by this report was one of extraordinary losses. The loss of the World's Fair travel must be considered, and general business had not recovered from the depression of the two years that had preceded. Then, early in the year, came the great Pullman strike, which practically stopped traffic for a time. This was followed by the crop failures, almost complete in Iowa, Nebraska and South Dakota, and very serious in other regions served by the company. As a consequence of the failure of the corn crop and the crop of spring wheat, and of the extraordinarily low price for wheat, the tonnage moved over the system fell off, not only because there was less grain to move, but because the farmers could buy less goods of all sorts.

The elements of economy in operating expenses are interesting. The locomotive mileage declined 2,340,565 miles, or more than 7 per cent. The cost of locomotive service was reduced almost 10 per cent. and it was reduced in greater ratio than the mileage; that is, the cost per mile run was 18.67 cents in 1894 and 18.1 in 1895. More miles were run to the ton of coal, to the pint of oil and to the pound of waste, than in the preceding year, indicating very great care and rigid economies. In repairs and renewals of passenger cars the saving was not very great, that item having been $334,000 in 1894 and $324,000 in 1895. In freight cars there was more difference. In 1894 $1,082,000 was spent in repairs and renewals; in 1895 this item was $878,559. In maintenance of road and track there was also a very marked saving. The expenditure for this item in 1894 was $3,202,000; in 1895 it was $2,420,000. In repairs of bridges, buildings, fences, etc., there were considerable savings, but not so great in amount or percentage as in maintenance of track. Notwithstanding the losses of the year, dividends to the amount of 4 per cent. on common stock and 7 per cent. on preferred were paid.

Mr. Hughitt informs us that the material and labor expended have been sufficient to maintain the property in good condition. A good deal of work was done during the year in equipping passenger trains with steam-heating apparatus and Pintsch gas apparatus and in fitting up freight cars with air-brakes and automatic couplers; all of these in addition to usual repairs and renewals. Mr. Hughitt refrains from making any forecast for the future, but we are all justified in the hope that the next report of this substantial property will be far more favorable than this one.

"There are now 21 persons in the Beaver jail, most of whom have been incarcerated by the officials of the Pittsburg & Lake Erie Railroad for train jumping. This putting train jumpers in jail at the expense of the county is causing considerable complaint among the taxpayers, and the County Commissioners have been appealed to to see if there is any way to get recompense from the railroad company."

The foregoing is a newspaper item of a recent date from Beaver, Pa. We do not know how many "taxpayers" are really represented, probably very few, for reporters have to "make public sentiment" out of a very few expressions, sometimes in order to produce copy. Taxpayers do not generally worry themselves much about jail expenses until the bills come around to be paid, a year or two afterward. But we have no doubt that there are many people, both in Pennsylvania and other states, who think it would be entirely justifiable to make the railroads pay a penalty for getting trespassers removed from their trains or premises. Many others, who know it would not be just, still are perfectly willing to have the county officers evade the issue in any way that they find available. With such public sentiment as that it is no wonder that local magistrates impose light penalties upon tramps brought before them by railroad police officers. We trust, however, that the majority of the people of Beaver recognize the duty of the public to take care of its paupers and other defectives when they are on railroad grounds or trains, the same as when they are found on the highway or trespassing elsewhere; and we would suggest that the workhouse annex to their jail be made a little more effective. By increasing the work and decreasing the luxuries of the table the former can be made to pay for the latter. That is the testimony of experienced tramps. Meanwhile we hope that the suggestion of a correspondent on the first page of this paper, that railroads strengthen their police forces, will be generally followed. The Pennsylvania Railroad made considerable headway in driving off the tramps last year and the example there set can be followed on many other roads with equally good results. We are glad to see that it is already being followed in some places. With combined pressure by the railroads, the jailers and the municipal police, possibly some of the tramps may be driven to work—or to the woods.

The rapid changes, in time-honored methods of transportation, by engineering achievements, are well illustrated by the almost entire disappearance of sailing vessels from the river Elbe in Germany. There is a chain laid in the river from near Hamburg past Madgeburg and Dresden to about the mouth of the Moldan River. A chain tug will tow as many as six barges at a time and as a consequence the number of sailing vessels decreased from over 2,000 in 1870 to 215 in 1889, and to such an inappreciable number in 1894 that the Government feels justified in doing away with draw spans in railroad bridges. Such an alteration was recently made at Haemerten. The saving in bridge-tender's wages sufficed to pay 3½ per cent. on the cost of the reconstruction and considerable benefit accrues to navigation from the removal of the draw pier.

There is no one way of measuring the relative business situation at various times that is quite so convenient

and useful as by comparing the volumes of bank clearings. The last issue of *Bradstreet's* gives these for July and for seven months in each of the last four years. These are for the whole country in *millions*, as below:

	1895.	1894	1893.	1892.
July.....	$4,538	$3.495	$4.135	$4.623
Seven months	29,713	25,553	35,142	35,656

The July total is 30 per cent. more than it was a year ago, and has been exceeded only three times in that month for 10 years. It was greater in 1892, 1890 and 1889. These are some of the encouraging facts which appear from day to day.

Chicago fruit men say that the Southern Pacific's ventilated cars, for carrying fruit from Sacramento to Chicago in 120 hours without ice, do not succeed very well. It does not appear whether the trouble arises from failure to deliver the fruit in good condition or from the sharpness of the competition between the refrigerator car companies, which have so long had a monopoly, and the Southern Pacific Company, but it is stated that from June 7 to Aug. 1 only 30 of the ventilated cars came through, while the number of refrigerator cars received during the same time was 844.

NEW PUBLICATIONS.

Analytical and Topical Index to the Reports of the Chief of Engineers and the Officers of the Corps of Engineers, United States Army, upon Works and Surveys for River and Harbor Improvement. Vol. III., 1888 to 1892. Compiled under the direction of Major C. W. Raymond, Corps of Engineers. By Louis Y. Schermerhorn, C. E. and Holden B. Schermerhorn. Washington: Government Printing Office, 1895.

The idea of indexing the voluminous reports of the U. S. Corps of Engineers was an admirable one. These reports are so voluminous, and cover such an enormous variety and extent of work, that without a comprehensive index they are almost useless. The first volume of the Index, which was published in 1888, covered the reports from 1866 to 1879 inclusive; these reports making 23 volumes of over 19,000 pages. The second volume, published in 1889, brought the Index up to include 1887, covering about 22,000 pages. The present volume covers 22 volumes, containing over 17,000 pages; the aggregate covered by the three volumes of Index is 58,133 pages.

The works described in the reports are here arranged alphabetically, and under the name of each are references to particulars. For instance, one of the titles is Arthur Kill, New York and New Jersey. We find that the subject is continued from Vol. II., p. 28. There is a brief statement of the appropriations made and dates, and the contracts, to whom given and prices, with references under each to the volume and page of the report in which particulars will be found. Then follow references to the reports of engineers and to descriptions of operations, projects and surveys. An additional feature of this volume is the abstract of laws relating to river and harbor improvements from 1780 to 1873.

The compilations for this volume were made by Mr. H. B. Schermerhorn, under the supervision of Mr. L. Y. Schermerhorn, formerly U. S. Assistant Engineer, the same gentlemen having compiled the second volume. Major Raymond makes special acknowledgment of the fact that in making this compilation Mr. L. Y. Schermerhorn has given his time, labor and experience to the Government without compensation.

American Railway Master Mechanics' Association. Report of the Proceedings of the Twenty-eighth Annual Convention, 1895. Edited by Angus Sinclair, Secretary, 256 Broadway, New York.

Mr. Sinclair has issued the annual report of the Master Mechanics' Association with commendable promptness and in good shape. The engravings and printing and paper are good, and the index seems to be sufficiently detailed, although we have not yet tested it far. The nature and scope of the reports and discussions are familiar to our readers, they having been pretty fully treated in these columns.

TRADE CATALOGUES.

Wrought Steel Butts, Hinges, Etc., and Link Belting. The Stanley Works, New Britain, Conn., and 79 Chambers street, New York.

The Stanley Works issue a very handsome catalogue of 158 pages in flexible covers, large octavo form. They inform us that while this catalogue has but little more than half as many pages as the catalogue of 1887, it really illustrates twice as great a variety of goods, because of the condensation that has been made. For instance, the illustration of an article is given on one page and on the facing page is the list of prices of all the different finishes or varieties of that article. There are three pages of colored lithographs, showing actual colors of the goods illustrated. The catalogue has very convenient indexes for reference.

A Talk About Tie Plates is the title of a pamphlet which has been issued with the compliments of the Standard Railroad Equipment Co., of 143 Liberty street, New York City. It is an entertaining discussion, plainly and directly presented, and is designed to prove the superiority of the C. A. C. tie plate, made by this company. The argument aims to show the logical necessity of having a thick and stiff plate to avoid bending, a shoulder on the outside to make it a good rail brace, and small, sharp ribs for penetrating the tie. These should not be near the edge of the plate and should be directly under the rail.

Railroad Legislation in Tennessee.

The acts of the last General Assembly of Tennessee, have only lately been published, the work having been postponed on account of an extra session which was begun May 27. We find only two laws in the whole volume that affect railroad companies generally. The first one is Chapter 152, approved May 14, which authorizes railroad companies to build branches, not over 8 miles long, to any mill, quarry, mine, or manufacturing plant or to the bank of any navigable stream, without having their charters amended. Private property must not be taken for such purpose without condemnation according to law.

Chapter 175, approved May 14, relates to bonds for the faithful performance of duty, etc., and states that corporations may be accepted as surety on such bonds. There are regulations under which surety companies from other states must act when doing business in Tennessee. A clause in Section 1 says that "no officer or person having the approval of any bond shall exact that it shall be furnished by a guarantee company or by any particular guarantee company."

Pennsylvania State Railroad Report.

There are no railroad commissioners in the State of Pennsylvania, but the Secretary of Internal Affairs exercises supervision to a certain extent over railroad, canal, telegraph and telephone companies, and Part IV of his report, which is Official Document No. 9, deals with these. The report for the year ending June 30, 1894, has lately been issued.

As in so many other states, there has been delay in consequence of the dilatory action of some railroads in sending in their accounts, and a dozen pages of this report are taken up with a statement of the action of the Deputy Secretary, Mr. Isaac B. Brown, who is in charge of railroad matters, in trying to get a report from the Ontario, Carbondale & Scranton road. This company was threatened with the $5,000 penalty prescribed by the law, but the officers made affidavit that the Secretary of the company had deceived them (representing that the report had been sent when it had not) and they discharged him from the employ of the company. The fine was not imposed. Secretary Brown's report was also delayed by a fire in the office of the public printer, which destroyed the reports of 159 railroad companies before they had been examined and put in print.

The necessity of a railroad bureau in the department of internal affairs is made the subject of an argument taking up five pages. It is pointed out that the commissions in other states do valuable service, and a statement is presented showing the number of commissioners, and their salaries, in 18 states. The salaries vary from $8,000 each for three Commissioners in New York to $5 a day each for three Commissioners in Maine. The argument is based mainly, indeed almost wholly, on the necessity of a public authority to pass upon and determine the safety of railroad structures and equipment. It is pointed out that recently in the State of New York the Commissioners condemned certain bridges and roadbed, compelling the company to stop the running of passenger trains until repairs were made; but this same company owns a track in Pennsylvania and continues to run trains upon it, no authority being conferred upon any state officer to take action like that taken in New York. A great majority of the railroads in Pennsylvania are safe, and "the Pennsylvania, most perfect in construction and equipment, able and aggressive in management, needs no supervision on the part of the State"; but it is known that there are several lines whose condition is such as to require state supervision to insure that their roadway and equipment are in serviceable and safe condition. The constitution is believed to forbid the establishment of a railroad commission independent of the Secretary of Internal Affairs.

The number of employees for each 100 miles of road in Pennsylvania is 951, a decrease of 154 from the previous year. The Pennsylvania reported 49,001 employees, which is 5,610 less than the number reported in 1893. Other roads reported even larger decreases. Thirty-seven passengers, 399 employees and 983 other persons were killed during the year, and 703 passengers, 6,519 employees and 1,447 other persons were injured.

The reports of the railroad companies appear in full, though some of them seem to have been made out on a plan which was not designed with a view to fullness. The tables summarizing the information from different companies under each important head seem to be very full and complete.

Missouri Railroad Commissioners' Report.

The 19th annual report of the Missouri Railroad & Warehouse Commission has just been issued, although it was finished Dec. 29. In consequence of the failure of some railroads to send in their reports, the Commissioners' report could not be delivered to the state printer until Jan. 15, when other work having precedence had accumulated. The report covers a year and a half, from Jan. 1, 1893 to June 30, 1894, but the statistics are for the 12 months ending on the latter date. The railroads give incomplete statistics, several sending nothing as regards Missouri traffic, and the Commissioners recognize the fact that their tabulations are therefore very unsatisfactory.

The opening part of the report tells how freight rates have fallen in Missouri since 1877; and, estimating that 15 per cent. of the aggregate freight earnings reported by the roads accrued on freight originating or terminating in Missouri, a computation is made showing what a great saving the people of Missouri have enjoyed by reason of the reduction of the average rate per ton per mile from 1.71 cents in 1878 to 0.95 cent in 1893. Reductions ordered by the Commissioners are mentioned, and it is stated that those on grain and coal alone amount to much more evey year than the expenses of the Commission. The report also points apparently with pride, to the fact that the Commissioners ordered a reduction of 30 per cent. in the rate on cotton goods, "affecting the entire shipments of such goods to every railroad station in Missouri." As this is evidently intended to arouse a feeling of satisfaction in the minds of the citizens it is to be regretted that the Commissioners did not compute the gross amount saved by each inhabitant yearly on his cotton cloth. It must be something over a cent, on the average; possibly as high as 10⅛ mills.

The length of railroad in Missouri, June 30, 1894, was 6,525 miles, an increase since Jan. 1, 1893, of 122 miles. All of the railroads are now standard gage except 77 miles. Missouri has one mile of railroad to 10.65 sq. m. of territory, and one mile to each 444 inhabitants.

The Commissioners recognize that a thoroughly efficient supervision of bridges would require the constant services of an expert, but they have given much attention to the bridges and numerous repairs have been made on their recommendation. The length of bridges in the state is 141 miles, of which 104 consists of wooden trestles and 14 of iron bridges. There are 5,784 highway grade crossings, not including street crossings in cities and towns, and 396 crossings above or beneath the railroad track. There are 324 crossings of one railroad with another, of which 256 are at grade.

Five passengers, 59 employees and 110 other persons were killed during the year and 49 passengers, 360 employees and 119 other persons were injured.

The official correspondence and acts of the Board take up about 450 pages, and it would seem that everything is spread out at length. Notes on the inspection of half a dozen roads, including a branch of one prosperous company, indicate either that very poor track is more common in Missouri than some other states, or that the Commissioners are more vigilant and faithful in detecting defects and reporting them to the companies. In some cases the speed of trains was ordered reduced to 10 miles an hour until necessary repairs should be made. The complaint of the Chicago & Alton concerning the action of the Board in forbidding that road to use gates on passenger cars, and to demand a ticket from each passenger on entering the train, is reported to the extent of 69 pages, a lengthy hearing being given verbatim.

The report of the warehouse department occupies 20 pages.

Alabama Railroad Commissioners' Report.

The fourteenth annual report of the Railroad Commissioners of Alabama has been issued, for the year ending June 30, 1894. The total length of railroad in the state is 3,609 miles, of which 104 miles belongs to mining companies or other concerns which are not common carriers and which do not report officially to the board. The new railroad built during the year amounted to 35 miles. Four passengers, 30 employees and 60 other persons were killed during the year and 77 passengers, 584 employees and 86 other persons were injured. The total valuation of railroad property for taxation was $46,841,778. This is made up of three classes of property, main track, side track and rolling stock.

Complaints of freight rates, of delays of freight and insufficiency of passenger station accommodation, have been attended to as promptly as possible. Delays in the payment of overcharges continue as annoying as ever and they are made the subject of a special chapter, which sets forth in strong terms the slipshod conduct of the railroads in this matter, which seems to be as bad in Alabama as everywhere else. The Commissioners clearly point out that no specific legislation can be devised which will remedy the difficulty. They suggest that, as the railroads manage the Birmingham Car Service Association quite smoothly, adjusting expenses and other financial matters through a clearing house, they ought to be able to devise something equally simple to expedite the handling of claims. The Commissioners state that they fully realize the serious financial straits in which nearly every railroad company has found itself during the year and they have therefore earnestly tried to impose no unnecessary burdens upon the roads.

The reports sent in by the companies are printed at great length, occupying nearly 700 pages.

Western Roads and the Grain Traffic.

Inquiry among the managers of the railroads west of Chicago indicates that they expect to be able to handle the heavy crops of this year with all necessary promptness. While most if not all the Western roads have largely increased their shop forces, there are other causes for doing so than the necessity for repairing the box car equipment in preparation for the grain carrying trade. The changes in freight cars rendered necessary by the safety appliance law have necessitated overhauling the equipment and putting most of the cars through the shops. It cannot be said that the equipment on any of the lines has been allowed to run down, in the general acceptance of the term. The light freight movement for the past year and a half has enabled the roads to prett

thoroughly overhaul their cars without keeping large forces at work in the shops.

The Burlington is the only road that admits having been runing with a diminished equipment, although the Rock Island has found it necessary to purchase a few new cars. This is owing, however, to a generally improved condition in traffic all along that line. The most of the roads increased their grain equipment largely in 1889 to carry the heavy corn crop of that year and since then have had a surplus of box cars which they are glad to again have a prospect of utilizing.

The Atchison has a box car equipment of something over 13,000 cars available for the grain business. A larger proportion of its cars are on its own tracks than usual at this season of the year and box cars are now largely in place for use as grain business starts up. All the equipment is in good shape, generally speaking. Perhaps six per cent. of the cars are on repair tracks. Many of these cars, however, are being held to complete the work of application of grabirons and raising of drawbars. No new cars will be purchased. The hours of repair forces are being increased in order to get all the safety appliance repairs out of the way before the demand comes for cars for the grain movement. On account of a comparatively light movement of wheat, the road will be in better shape to promptly handle the corn than in former years. Everything is looking favorable for the corn crop, the Kansas corn now being mostly past damage from any cause.

On the Chicago, Milwaukee & St. Paul equipment is in good shape and not in need of extensive repairs. The equipment was increased in 1893 to take care of the grain crop of that year and it has not been necessary to further increase it since. No new cars will be purchased. The corn crop will not begin to move for four or five months, but there is a considerable movement of wheat which will increase within the next two weeks. Corn is looking well in all parts of the St. Paul's territory. Neither Minnesota nor the Dakotas will export much, but there will be a tremendous movement from Illinois, Iowa, Nebraska and Missouri.

The Chicago, Rock Island & Pacific is at work putting all the equipment in shape, but is not hurrying particularly, as it will be some three months before the corn crop will begin to move. Probably 300 box cars will be added for the grain trade and by the time the cars are required it is expected to have all the equipment in shape and sufficient to handle the crop. Corn is all right except for a little spot in Nebraska where it is dry, but generally speaking the crop will be enormous, especally in Iowa and Kansas.

On the Chicago, Burlington & Quincy all the grain cars are being thoroughly overhauled and repairs have been going on for some time. It has not been determined whether any new cars will be purchased or not, but there is some probability that it will be found necessary to increase the equipment, because the last two or three years the company has been keeping close to the lowest possible limit. A large increase has been made in the working force of Aurora and other shops. Wheat is beginning to move over the northern lines of the Burlington, but there will be no movement of corn until December. In Iowa and Illinois crop reports are very favorable, but the acreage and conditions are best west of the Mississippi. Reports from Missouri indicate an assured crop.

The Chicago & Alton was one of the roads which largely increased its equipment three years ago, and in fact has for some time had a large equipment, considering its mileage. Consequently, no new cars will be needed, but the present equipment will be all in shape to handle the grain crop when it commences. No great demand for grain cars is looked for before January, when the Illinois and Missouri corn crops will begin to move. The equipment is all being overhauled, but the officers say that no extensive repairs will be required. The shops are running on full time, however, and considerable work is being done.

The heaviest years' freight business ever done by the Chicago & Northwestern was in 1892. The carrying capacity of the freight equipment at present as compared with that year is as follows: Stock-car equipment increased by construction of special 36-ft. cars; there now being some 2,000 in the equipment. The increase in carrying capacity brought about by constructing cars of 60,000 lbs. capacity instead of 24,000 lbs. and 28,000 lbs., and by new cars added amounts to 23 per cent. on box cars, 41 per cent. on furniture cars, 49 per cent on flat cars, 48 per cent. on gondola cars, 60 per cent. on refrigerator cars, 53 per cent. on stock cars; total increase in carrying capacity 33 per cent. Repairs are well up and no special work is being done, but considerable work is being done in the way of rebuilding the small capacity cars. No further additions to equipment will be made for the grain movement. Considerable wheat and small grain is moving on the Minnesota divisions, but no corn movement will take place until the first of the coming year. Crop reports are equally favorable with those of other roads.

The Illinois Central has just received 1,000 new box cars and 300 new refrigerator cars, which, together with smaller additions, has practically doubled its equipment in this department during the past three years. Cars in bad order have not been allowed to accumulate, consequently it has not been found necessary to make any especial effort to get the freight equipment in shape, and all the repair work is up to date. A good corn crop is expected from the South this year in addition to the local crop. The Southern farmers will raise considerably more corn than heretofore, probably 10 per cent. more acreage, and the crop is in excellent condition. Corn will not commence to move much, if any, before December.

TECHNICAL.

Manufacturing and Business.

Mr. E. G. Fisher, of the Page Woven Wire Fence Co., who has just returned from England, informs us that while there he took orders for trial lots of the Page fence from the London & North Western, the Great Western, the South Western, and the Great Northern of Scotland, also for two or three South American lines. Mr. Fisher's visit to England was primarily to be there during the International Congress and incidentally to explore the field for his fence in that country. In both objects he seems to have had considerable success.

Thomas Carlins' Sons, manufacturers of hoisting engines and contractors' machinery at Allegheny, Pa., report a large number of orders for hoisting engines, and that department of their works has been extremely busy for some time. The derrick department has also been overcrowded with work for some time past, and the outlook for future business is very bright.

On Monday, Aug. 5, the Griffin Wheel Company will put in operation three floors of the addition to its wheel foundry in Sacramento avenue, in Chicago. This addition, when completed, will have seven floors, and 50 annealing pits, and will increase the output of the works to 800 wheels a day.

The firm of Bryan & McKibbin has been formed, with office at 120 Broadway, New York City, for the purpose of dealing in railroad, steamship and contractors' supplies. Both Mr. Bryan and Mr. McKibbin are old railroad men, and thoroughly familiar with the business which they are now undertaking.

The Taylor Iron & Steel Co., High Bridge, N. J., has recently installed the C. W. Hunt Company's system of cars and track for handling material. The Otis Company, of Ware, Mass., has made additions to its already complete system of Hunt railroads.

The Brooks Locomotive Works on August 1 restored the 10 per cent. reduction of wages which was made in January, 1894. It is said that at present about 1,200 men are being employed at the Brooks Works.

The Automatic Injector Co., of Cincinnati, O., is meeting with success in the introduction of its automatic water injector. It will be applied to four locomotives, that are to be exhibited at the Atlanta Exhibition. Two to be built by the Rogers Locomotive Co., and two by the Richmond Locomotive & Machine Works.

The Bickford Drill Co., of Cincinnati, O., as an indication of an improvement of trade say that the company did more business in the month of July last then in any previous July in the history of the company. Among recent orders was one for two large radial drills to be shipped to the Transvaal, South African Republic. This makes nine that have been shipped there during the past few months.

The Joyce Cridland Co., of Dayton, Ohio, is very busy with many orders on hand. Its business during July was larger than in any month during the past two years.

The Springfield Malleable Iron Co., Springfield, O., is working full time and full force in all departments, and is doing a good business with its car coupler.

Mr. Rodney Ludlow, of the Springfield Malleable Iron Co., Springfield, O., will in future make his headquarters in Philadelphia for the purpose of extending the business of the company in the East, and has taken an office at No. 843 North Broad street.

The Climax Injector Co., of Springfield, O., is meeting with good success in the introduction of the Climax Oil Injector. It is now in use on about 20 roads, and a number of the roads have sent duplicate orders.

The National Foot Guard Co., of Columbus, O., reports that its foot guard for frogs, etc., is now in use on about 25 roads and is on trial on 12 others.

The Buckeye Malleable Iron & Coupler Co. of Columbus, O., reports that it is doing a large business with its Little Giant Car Coupler, and state that out of 15,000 or more in use, only three couplers have had broken knuckles. The Columbus, Hocking Valley & Toledo has been using the couplers for the past nine months, and despite the hard usage that they have been subjected to, it reports not a single breakage during that time. The Baltimore & Ohio is having four postal cars built by the Pullman Co. on which the Buckeye Coupler is specified.

The New Columbus Bridge Co., Columbus, O., report business as improving. The company is now employing 80 men, and has several large contracts in Indianapolis, Texas and other places.

New Stations and Shops.

The contracts for rebuilding the shops of the Atchison, Topeka & Santa Fe at Arkansas City, Kan., have all been awarded and work on the buildings will be rapidly pushed. The town has deeded 15 acres of land adjoining the company's present property for the enlarged shops. The machine shop will be 70 ft. × 100 ft. and the new roundhouse will contain 25 stalls, the old roundhouse which was burned having only 10 stalls.

Iron and Steel.

The Reading Iron Co. has assumed charge of the rolling mills of the Montour Iron & Steel Company at order for 3,000 tons of rails for the Denver & Rio Grande. The company's officers state that this order, with previous orders, will keep the rail mill running at its full capacity for some time to come.

The Toledo & Ohio Central has recently purchased 2,500 tons of 70-lb. rails from Carnegie & Co.

The Chicago Drainage Canal.

On July 19 Mayor Swift of Chicago, noticing that the pollution of the city's water supply at the different intakes was not wholly due to the discharge of the Chicago river, but to the various sewers emptying directly into the lake, addressed a letter to the Board of Trustees of the Danville, Pa., and they will be placed in full operation by Aug. 12. About 400 men will be employed at the start. Grooved skelp, merchant bar, light rails, etc., are turned out. Theodore F. Patterson has been appointed Superintendent of the Danville plant.

The Union Steel Mills of the Illinois Steel Co., at Bridgeport, Chicago, have been started up, giving employment to about 1,400 men. These works have been closed since 1892. Vice-President Stirling, of the Illinois Steel Co., says that the company decided to open the Bridgeport mills because the capacity of the Joliet and South Chicago works was not sufficient to keep up with the present demand for material. Besides these three mills, the works at Bay View, near Milwaukee, are also running steadily, but it is not anticipated that the mills at North Chicago will be started up for some time, and they have been leased to another party.

The Colorado Fuel & Iron Co. has recently received an Sanitary District in which he asked the following questions:

When may the completion of the main drainage channel be reasonably expected?

How soon afterwards may the city expect the completion of the adjuncts—intercepting sewers—or reversal of grade of lake emptying sewers—so that the sewage pollution of the water supply may cease?

Is there any reason why work should not be begun on these necessary adjuncts, and progress simultaneouly with the construction of the main channel?

At a recent meeting af the Board, answer was made to Mayor Swift. It is expected that the completion of the main channel will be in the fall of 1897. Nearly 60 per cent. of the work has been done, and many of the sections will be finished in a few months.

In reply to the second question which is a very important one to the city, the trustees report that it is not required of them to make any changes in the lake emptying sewers, but all such changes are under the control of the city, and not the Sanitary District. When the main channel is completed and a flow of water through it is established, an outlet will be furnished capable of disposing of the sewage of the district in a satisfactory manner, but it will be necessary for the city to construct its own sewers emptying into this outlet. Even were it the province of the district to construct these sewers, the trustees report that the available funds are already anticipated by work now under contract for the completion of the main channel.

This report which was the result of the opinion of General Council J. P. Wilson of the Sanitary District, throws the whole responsibility of preventing the pollution of the water supply by the lake sewers on the city and not on the Sanitary District. This means a large expenditure by the city before all the benefits of the drainage canal can be realized.

Asphalt Paving Contracts.

New asphalt pavements will be laid in New York on Allen street, from Division to Houston, Chrystie street from Grand to Houston, Clinton street from Division to Houston, Essex street from Division to Houston, Orchard street from Division to Houston, Pitt street from Broome to Houston, Suffolk street from Division to Houston, on the east side of the city, in densely populated districts. Asphalt pavements will also be laid on two fine residence streets, Fortieth street from Eighth to Eleventh avenue, and on Fifty-eighth street from Lexington to Third avenues, and from Seventh to Tenth avenues. Bids have been received. Those of the Fruin-Bambrick Company, of St. Louis, were from $3.30 to $3.50 a square yard, which was from 10 to 50 cents lower than the other bids. There were four other bidders—the Sicilian, Barber and Warren-Scharf companies, and John J. Cummings. Contracts were awarded to the Fruin-Bambrick Co. for a portion of the work, and the rest will be readvertised for.

The Columbia's Speed Run.

The United States triple screw cruiser Columbia, which started from Southampton on July 27, with the intention of making a fast run to New York, made the trip in 6 days, 23 hours and 49 minutes. Her captain was instructed to use forced draught on the last day out, but was unable to do so, since by that time the supply of coal was so low, that it could not be brought from remote parts of the ship, to the furnaces, fast enough. The entire run was thus made under natural draught. Had forced draught been used as intended, the record would have been considerably lower.

The Metropolitan Elevated—Chicago.

The Humbolt Park branch of the Metropolitan Elevated was opened July 29, the first regular train leaving the Lawndale station at 5 a. m. The trains will consist at first of two or three cars, with larger trains if the service requires. From Lawndale the trains are backed down to the junction with the Logan Square line at Robey street and North avenue, where the trailers are

coupled on to the Logan Square trains. The last coaches of the Logan Square trains running out of the down town terminal are dropped at the junction and run thence over the Humbolt Park line. The whole Metropolitan system is now in operation with the exception of the proposed Douglass Park division, for which the right of way is not yet purchased. This division will start from the main junction at Paulina street, run south almost to Twenty-first street and thence west to Ogden avenue. There are four divisions now in operation, consisting of division I., the main four-track line from the down town terminal at Franklin street to the junction at Paulina street, a distance of 1.813 miles; division II., the Garfield Park double-track line from the Paulina street junction to the city limits at West Forty-eighth street, a distance of 4.109 miles; division III., the Logan Square double-track line from Paulina street junction to Logan Square, a distance of 4.490 miles; and division IV., the Humbolt Park double-track line from Robey street to Lawndale avenue, a distance of 2.134 miles. The total number of miles of double track is 10.733, and of four tracks is 1.813 miles, giving in all 28.718 miles, not including yards.

The distances of the outer terminals from Franklin street are: West Forty-eighth street, 5.922 miles; Lawndale avenue, 6.789 miles; and Logan Square 6.303 miles. The running time between each of these three terminals and Franklin street is 25 minutes, making the miles per hour, respectively, 14.21, 16.29 and 15.13. The number of stations, including terminals, in the first-named route is 18, or 3.04 per mile, on the second 17, or 2.50 per mile, and in the third 15, or 2.38 per mile. This is exceedingly good time, and is faster than that of any of the other elevated roads in Chicago, all the trains making stops at every station.

A full description of the structure and equipment of this road can be found in earlier issues of the *Railroad Gazette*.

New B. & O. Passenger Station in Baltimore.

The Mt. Royal station of the Baltimore & Ohio in Baltimore, the first of the Belt Line stations, will be built on the old Bolton lot. It will be of granite, 230 ft. × 53 ft., with a clock tower in the center 150 ft. high. The building will have two stories, although only the ends will have two floors, as the central part which will be used for waiting rooms will have very high ceilings with a gallery along the east and west walls, connecting the upper floors in the two wings. The first floor will be on the track level and the four tracks will be spanned by a train shed 490 ft. long, separated from the station by a platform 30 ft. wide. A roofed platform will also extend all around the structure. Inside the main building will be a general waiting room, 42 ft. × 60 ft., and a ladies' waiting room, 42 ft. × 40 ft. Between them will be the ticket office, news stand, telegraph office and bureau of information. Toilet rooms will be attached to each waiting room. In the north wing of the building will be the baggage room. In the south end will be a restaurant adjoining the general waiting room, over which will be a kitchen, servants' quarters and storeroom. The offices for the train dispatcher and other station officials will be over the baggage room at the north end. The interior fittings of the station will be white oak. The ceiling will be of metal, panelled and decorated in colors. The tower is early renaissance, with a tile roof, and it will have an illuminated clock face on each of its four sides. In front of the tower on the ground floor will be a porte cochère. Entrance to the station grounds will be had by an inclined driveway and footways from Cathedral street, and from Brevard street by a flight of steps along the eastern wing wall of the tunnel entrance. A large portion of the Bolton lot will be left unoccupied and will be made into a park.

The Massachusetts Ship Canal Again.

The Massachusetts Ship Canal Co., through its President, Benjamin J. Berry, and Counsel B. S. Parker, petitioned the Joint Board of Railroad and Harbor and Land Commissioners on July 29 for the approval of the issue of $15,000,000 stocks and bonds, which issue was authorized by the last legislature for the building of the canal. An issue of only $500,000 was granted, the proceeds of which are to be used for preliminary work. An act of the legislature passed in 1894 contained a provision that issues of stock and bonds by railroad and street railroad companies shall be made from time to time in such amounts only as may be deemed by the railroad commissioners reasonably requisite for the purposes for which such issue has been authorized. Under this restriction the small amount of stock was allowed, the charter of the company providing that issues of stock shall be made in accordance with the provisions of the above law.

A New Drydock at Southampton.

A very large drydock was opened at Southampton on Aug. 3, by means of which trans-atlantic steamers may be examined and repaired at the same dock at which they land. The dock is 35 ft. deep and 87½ ft. wide at the entrance. Its powerful pumping engines empty it in two hours and 15 minutes, delivering water at the rate of 540 tons per minute. The vessels of the American line will be docked in this way in the future.

THE SCRAP HEAP.

Notes.

The principal Massachusetts railroads have asked the railroad commissioners to postpone the date on which the Massachusetts law concerning grabirons and drawbars must be complied with.

On Saturday last, according to press dispatches, train No. 51 on the Philadelphia, Wilmington & Baltimore ran 5.1 miles, from Landover to Ancostia, in 3 minutes The engine was No. 92, a new one recently built at Altoona.

The Michigan Central Railroad has ordered from the General Electric Company two search lights with which to illuminate Niagara Falls. The lamps will be of 100,000 c. p. each, and will have 48-in. reflectors. They will be placed near Falls View station.

Two eight-year-old boys, arrested in New York City for throwing stones at passenger trains of the New York Central last week, were held by Magistrate Mott in $1,000 bonds each. It is pleasing to see that there is a magistrate who appreciates the seriousness of this offense.

At a meeting in Pittsburgh Aug. 2, the coal operators and the miners agreed upon a scale of wages to go into effect Oct. 1. The rate in the Pittsburgh district will be 69 cents a ton, with a differential of 5 cents in favor of operators who do not run stores. The miners in the Brazil (Ind.) district, under their contract with the operators, will have their pay advanced to 70 cents at the same time.

The plan for the separation of grades in Lowell, Mass., at the railroad crossings at George, Church, Rogers and Lawrence streets, has been confirmed by the Superior Court. These crossings are on the Lowell & Andover line of the Boston & Maine, and the change involves the construction of a piece of new railroad to connect this line with the main line, so that trains may run to the central station.

Three young men have been arrested in Philadelphia for stealing 500 torpedoes from the storehouse of the Philadelphia & Reading Railroad. Some of the torpedoes were distributed among other toughs, and the gang amused themselves by stopping freight trains and exploding torpedoes under street cars. A woman and a child were injured by fragments of shells exploded on the street railroad tracks.

A fire at Sprague, Wash., Aug. 3, destroyed property valued at more than $1,000,000. The Northern Pacific Railroad Company is the heaviest loser. Its losses include 24 locomotives, 54 freight cars, $325,000 worth of shop machinery, etc., headquarters, $50,000, passenger station and freight warehouse, etc., $125,000; also 7,000 tons of coal and 5,000 cords of wood. One account says that the Northern Pacific's loss is $750,000.

A story is published at San Francisco, said to be based on information given by railway postal clerks, that during the month of June, 1894, when the mails were being weighed for the purpose of calculating the rate of compensation for the ensuing four years, the bags were stuffed so as to fraudulently increase their weight. It will be remembered that a railroad president in Iowa was arrested on a charge of this kind a few years ago.

The flood at Socorro, New Mexico, July 31, where there was much loss of life, destroyed about a mile of the roadbed of the Atchison, Topeka & Santa Fe and greatly damaged eight miles more on the Magdalena branch. On July 30 a furious rain near Florence, Colo., damaged the Florence & Cripple Creek Railroad badly for eight miles, stopping traffic probably for a week. Many trestle bridges were carried away, and it was estimated that the loss to the road was $35,000.

The Capital of the Philadelphia Union Traction Co.

The new Philadelphia Union Traction Co. will begin business with about $10,000,000 paid-up capital. Besides the $3,000,000 to be derived from the first call on the stock of the company, the latter will have the $1,200,000 in bonds now in the treasury of the People's Traction Company, the Electric Traction Company's holding of 10,001 shares of the Lehigh avenue stock, and the Philadelphia Traction Company's holdings of the stock of the Union, Empire, Seventeenth and Nineteenth streets, West Philadelphia, and other subordinate companies, valued in all at $7,700,000, making the total capital $10,700,000, of which about $3,000,000 will be used on improvements contemplated or under way.

The Largest Freight Steamer Afloat.

A new steamer has been built for the White Star Line at the yards of Harland & Wolf, Belfast, and is the thirty-fourth vessel built by the same firm for the same line. The vessel was named Georgic. She is 575 ft. in length, and registers 6,500 tons net and 10,000 tons gross. The Georgic is now the largest cargo steamer afloat. She is fitted with two sets of triple expansion engines. Accommodations for over 1,000 head of cattle and permanent stalls for a large number of horses. The Georgic will engage in the New York-Liverpool service.

A World's Record in Steel Making.

The tonnage men in the converting department of the Carnegie, Edgar Thomson Steel Works at Braddock, made an unprecedented run between the hours of 6 p. m., July 30, and 6 a. m. July 31. The run surpassed the former world's record, also held by the Edgar Thomson Works. With two 15-ton converters, 73 heats, the product was 110 tons and 960 lbs.

Lake Notes.

The Duluth, Missabe & Northern road will build a large combination dock at Duluth. It will be used partly for ore and partly for merchandise. No plans have been made as yet. The Ashland Iron and Steel Co., of Ashland, Wis., will build a dock 2,000 ft. long for its pig-iron trade.

The Pennsylvania road has built large flour-receiving docks and sheds at Cleveland, O., and now the Erie road is to do the same. Both roads are preparing for making the receipt of Duluth flour a large item in the business of that port. Heretofore flour from Lake Superior has gone to Buffalo, Sandusky and Erie. Northwestern millers have notified transportation companies that shipments of flour from Duluth will be very large for some time to come.

South American Notes.

A new company has just been brought out in London by Messrs. Praschkanes & Co., controlling the sulphur deposits at Ascotan, on the line of the Antofagasta and Bolivia Railway. The deposit is 140 acres in area, and is estimated to contain 500,000 tons of sulphur ore, yielding 33 per cent. of sulphur. Arrangements are being made to ship 12,000 tons per annum, all which will be carried by the Antofagasta and Bolivia Railway.

Surveys have been begun by E. Bobillier for a new railroad in Chili, between Sauces and Canete.

Some of the Argentine railroads are objecting to the new law requiring them to furnish statistics to the Statistical Bureau. In consequence of non-compliance several roads have been fined in sums ranging from $500 to $1,000.

Work has been begun on a new line of railroad from Rio de Janeiro to the town of Therezopolis, which is expected to develop Therezopolis into a suburb equalling the famous Petropolis.

The perennial project for a railroad from the Lake of Maracaibo, in Venezuela, to the Savanna of San Ignacio, has come into prominence once more in the form of a contract to build this road, entered into between the Venezuelan Minister of Public Works and the firm of Romaz & Co. The line is to be styled the Perija Railway, and is to have a gage of 3 ft. 6⅛ in. Its terminus on the lake is to be at Barranquilla, and the company is to establish a line of steamers between that port and Maracaibo. No guarantees of interest are given, but the government cedes a right of way, lands for stations and sidings, with alternate blocks of land for colonization. It is also to be exempt from assessment for taxes, but is to pay 5 per cent. of its net profits to the government. Another similar contract has been entered into with Messrs. Auer, Leiwa, DeLima *et al.*, for a line, to be called the Carora Railway, from Lake Maracaibo to Lake Carora, in the State of Lara.

Street Railroad Notes.

One of the street railroad companies in St. Louis is putting in a larger electric generator than that heretofore used, with a view to providing ample power for heating the cars by electricity during cold weather.

The Railroad Commissioners of Massachusetts have issued an order requiring electric street railroad cars to be heated, during the five winter months, by suitable electric apparatus. When the outside temperature is below 50 deg. the cars must be heated inside to a temperature of not less than 50 degs. nor more than 60 degs Stoves now in use may be continued until further orders.

The Brooklyn Heights Railroad, whose electric cars traverse 200 miles of tracks in the streets of Brooklyn and adjoining towns, announces that it will soon have special excursion cars for "trolley parties." Open cars will be built for day excursions and closed drawing room cars for theater parties.

It is announced that storage batteries are soon to be used for the propulsion of street cars on the Fourth and Madison avenue line in New York City. This line is owned by the New York & Harlem Railroad Company, and storage battery cars were run upon it about six years ago, but were taken off in consequence of a legal controversy over the patent. Chloride accumulators are now to be used, of a kind which, it is said, has been in use in Paris for several months. Fifteen cars are in regular service there, and the same apparatus is in use on 12 cars in Birmingham, England. Trips of 70 miles are made with one charging of the battery. The cars for the Madison avenue line are now being built in New York City. They will be of the usual type of electric cars, 18 ft. body and about 23 ft. long over all. They will be mounted on Peckham trucks, with General Electric motors. The batteries will not be carried in the car body, but will be suspended under the center of the car. The tray or box containing the batteries is readily and quickly detachable, and is removed for the purpose of charging by means of an elevator beneath the track, which lifts the batteries into position. On the elevator is a small transfer car running on rails to and from a cellar. A car can be loaded and unloaded in about half a minute with this arrangement. Any car body is adapted for use in this service, so that a company adopting the system can use its present car bodies.

The Board of Supervisors of Alameda county, California, have granted a franchise to E. P. Vandercook, of Oakland, Cal., to build an electric road in the county of Alameda, for the purpose of transporting freight, which will consist principally of coal, from the mines to tidewater. It is understood to be about 50 miles long.

In the *Railroad Gazette* of April 12 was given an account of the attempt of the Chicago General Street Railway Company to run one of its cars over the tracks of the Chicago City Railway Company on Twenty-second street, and the destruction of the car by the employees of the latter company. This attempt was based on an ordinance permitting the operation of the cars over the line in question on payment of a rental. After the destruction of the car suit was brought against the Chicago City Company by the Chicago General to prevent the former interfering with the cars of the latter, but a decision has just been given by the courts that the complainant cannot acquire a right to use the tracks of the defendant from the city council, but only by condemnation proceedings. The decision was interesting from the fact that the Chicago General Company claimed that after tracks were laid they belonged to the city and not to the company laying them.

The City & Suburban Railway Co., of Baltimore, which is extending its electric service to Ellicott City via Catonsville, is laying 9 in. girder rails on a portion of the route upon which there is very heavy wagon travel. The tracks are laid in the center of the Frederick turnpike, a macadam road, and on this account a girder rail is specified in the agreement between the Turnpike Co., and the railroad.

Speed of Electric Cars in Brooklyn.

The Brooklyn Heights Railroad Company has begun a suit in the Supreme Court to have the speed ordinance adopted by the Brooklyn Board of Aldermen declared null and void. This ordinance restricted the speed of the cars to six miles an hour within a mile and a half of the City Hall and within two miles of the Broadway ferry, and to eight miles an hour within the limits of the first 28 wards. All the railroad companies asked for a modification and the application was backed up with petitions from merchants and citizens, but no action has been taken by the board.

The complaint in the present suit sets forth that when the company got permission from the Aldermen in 1892, to change its motive power from horses to electricity, it was expressly authorized to run its cars at such a rate of speed as should enable it to secure to the public the advantages of better and more speedy transit, with due and proper regard to the safety of others using the

public streets, providing that such rate should in no instance exceed 10 miles an hour. Subsequently the State Railroad Commission approved these grants. More than $9,000,000 was expended in introducing electric apparatus and $2,000,000 more was spent for betterments upon the faith of the original grant of the Aldermen. It is alleged that the Aldermen had no power to adopt the restrictive ordinance, and that its enforcement is detrimental to the interests and convenience of the public, and would work irreparable pecuniary injury to the company.

Railroad Disaster in Japan.

A press despatch from Kobe, Japan, July 28, reports a train accident killing 140 soldiers on the railroad between that city and Ozaka. A train of 23 cars carring 400 Japanese soldiers, returning from China, was running along the seawall, on which the tracks as they approach the city are laid, when an immense sea leaped over the wall, throwing from the track the engine and 11 cars, which plunged off the wall into the bay. Most of the men in the cars were drowned like rats in a trap. The accident happened at about 1 o'clock in the morning, and the night was pitch dark. A storm was raging and the sea was running so high that it was impossible to render any assistance to the men in the cars. Some of the men who managed to get out of the cars while they were in the water were dashed to death against the wall.

Jamaica Railway.

The New York Equipment Co., 80 Broadway, New York City, has had charge of the awarding of contracts for the building and equipping of this road, referred to in our last issue. A. & P. Roberts & Co., of Philadelphia, have received the contract for building over 100 bridges and viaducts. The steel cylinders for the piers over Wag Water Creek, near Annotta, will be furnished by the Maryland Steel Co. Eppenger & Russell, of 66 Broad street, New York, will furnish the creosoted ties, bridge ties, guard rails and switch ties for the extension. There will be about 10 cargoes in all. Mr. James Irvine, President of the New York Equipment Co., is a member of the firm of James P. McDonald & Co., the contractors for the road.

Lake Shipping Matters.

The Minnesota Iron Co., which now controls and operates 12 steel freight vessels of the largest size, has let the contract for building two steel tow barges for the ore trade. They will be of about 4,000 tons capacity, and will be 354 ft. long. The company will have, with the completion of these vessels, next spring a capacity in an ordinary lake season for about 950,000 gross tons of freight from the head of Lake Superior to lower Lake Erie. It will be the largest tonnage owner on the lakes in a short time, as it will add to the barge fleet later. It now has 10 steam vessels, and the intention is to provide all, or nearly all, of these with consorts as opportunity offers. The company this year controls over 2,000,000 gross tons of freight, and will have more as the iron trade increases.

In June, 1894, the Hay Lake channel, cutting off 11 miles in distance below the Sault Canal, was opened for traffic. The channel cost the Government $2,165,000, and has been used in its first season by about $13,000,000 tons of freight. As the average cost of freight on the upper lakes in the past fiscal year was 99 mills, the channel has saved the vessel interests the neat sum of $148,500, or about 7 per cent on its cost. As the channel will be navigable by night and will save the fleet much time, its value is even greater than these figures show.

The report of the St. Mary's Falls Canal for July, just out, shows the month to have been a record breaker, passing all preceding totals. It passed 2,477,587 tons of freight and 7,903 passengers. So far this year there has been carried down the canal 4,010,000 tons of iron ore. The greatest preceding month was August, 1894, with 2,290,000 tons. It is likely that the present month will considerably exceed the last.

Reading and Pennsylvania Coal Contract.

The Pennsylvania Railroad has filed in Court No. 3 at Philadelphia a cross bill in equity in the matter of the contract between that road and the Philadelphia & Reading made in 1887 concerning anthracite coal traffic. In that year, the Reading being in the hands of receivers, the officers of the company filed a bill in equity alleging that in certain negotiations between a syndicate and the managers of the Reading road, members of the syndicate, interested in the Pennsylvania Railroad, had taken unfair advantage, tending to turn over to the Pennsylvania too large a share of the anthracite coal shipments originating on Reading lines. By an agreement made in June, 1887, the Reading was to deliver to the Pennsylvania 1,000,000 tons of anthracite coal annually at Pottsville to be marketed on the lines of the Pennsylvania. The Reading, in a bill filed some years ago, claimed that the Pennsylvania did not live up to its part of the contract. In February, 1890, the Pennsylvania moved to refer the controversy to arbitrators, but the Reading stood out, claiming that the legality of the contract was doubtful; and the Reading managers formally revoked the agreement. An injunction was issued by Judge Finletter, restraining the Pennsylvania from trying to secure arbitration. In the cross bill, now filed, the Pennsylvania claims that the Reading has failed to fulfill its agreement, delivering in one year, 200,000 tons of coal less than it had agreed to deliver. It is claimed that the losses due to this default amount to nearly $7,000,000. The Court is asked to declare the agreements of June 8 and 17, 1887, to be in full force and effect, and to be binding and obligatory in all respects upon the defendant company.

RAILROAD LAW—NOTES OF DECISIONS.

Carriage of Goods and Injuries to Property.

In New York in an action for damages by fire alleged to have been set by sparks from a locomotive, it appeared that the fire broke out soon after the locomotive had passed. Two witnesses for plaintiff testified that when the locomotive passed their house, half an hour before reaching plaintiff's premises, it was emitting large sparks. It further appeared that a quarter of a mile before reaching plaintiff's premises the grade of the track began to descend and was down grade for more than a mile. The engineer testified that when he passed the top of the grade he shut off steam and ran all the way down the grade by momentum. The evidence also showed that the spark arrester on the locomotive was of the best kind in use and was in good order. The Supreme Court rules that a verdict for plaintiff was against the weight of the evidence.

The Supreme Court of Missouri holds that the statute providing that a common carrier which receives goods for shipment or issues receipts or bills of lading in the state shall be liable for any loss caused by its own negligence, or that of any connecting carrier, does not prohibit a carrier from contracting with the shipper against liability beyond its own line.[2]

In the Federal Court it is said that in an action for damages for charging unreasonable rates for transportation from one state to another, shipments made before the adoption of the interstate commerce act are governed by the common law, and those made after the adoption of that act by the common law as modified by the act.[3]

In Vermont it is ruled that the refusal of a carrier to transport coal for a certain firm does not, in the absence of actual tender of a definite amount for transportation, amount to a waiver of such tender, so as to subject the carrier to liability for loss of business caused by relying on such refusal.[4]

Injuries to Passengers, Employees and Strangers.

In Texas it is ruled that a section foreman, with authority to employ and discharge hands, is not a fellow-servant of those under his control; and it is immaterial that he derived such authority only from the roadmaster.[5]

In the Federal Court it is said that though a switchman and track repairers work in the same yard, if an injury to the switchman is caused by the trackmen negligently leaving a dangerous hole in the track, their negligence is attributable to the employer.[6]

In Missouri the Supreme Court rules that the act of the agent of a railroad, who also kept a store at the station, in placing an open barrel of salt under a warehouse situated beside the track, and which belonged to a milling company, though on the railroad's right of way, is not the act of the railroad company, so as to render it liable for injuries to cattle attracted thereby.[7]

In Indiana it is held that a railroad is not liable for the action of its local check clerk of freight, in prosecuting one, without probable cause, for the theft of articles from its cars.[8]

In Texas a railroad having creosote works for the treatment of ties, had the ties brought in on one track, and piled between it and another, by which they were taken to the works. The Supreme Court rules that the business was not of such a nature as to require the company to prescribe rules for thus taking away the ties to leave the remnant of a pile in such condition that it would not fall on employees unloading other ties.[9]

In Michigan it is held that a brakeman who, in order to get employment as such, has pretended to an experience which he has not, and, being ordered onto a flat car to pull the pin for a running switch, instead of lying down on the rear end of the car, kneels down, and in that position is jerked off by the sudden start of the engine after the uncoupling, has no cause of action against the company.[10]

In Texas it is ruled that a railroad is liable for an injury resulting from a failure to properly insert a brake in its socket, when the car upon which the brake was, was thereafter carried some distance over the line, and past a number of stations at which it could have readily been inspected.[11]

In New York it is held that the failure of a master to make rules is not negligence, where the practice actually in force renders a rule unnecessary.[12]

In the same state it is held that where a railroad employee was injured by catching his foot between two rails where the blocking had come out, the company is not liable unless it had actual notice that the blocking was out, or unless the blocking had been out long enough to constitute constructive notice.[13].

In Michigan it is ruled that the mere fact that an employee of a railroad is injured while stepping between cars, while in motion, to uncouple them, in violation of a rule of the company, does not render him guilty of contributory negligence, where it is not only customary for the work to be so done, but also is necessary, in order to get the work done.[14]

In Virginia a railroad was excavating soil of a treacherous, rotten, and seamy character, requiring very great caution. Chambers were dug in on either side of the soil, and then the blocked-out mass was broken off. The chamber had been sunk to the depth of 13 ft., instead of 6 or 8 ft., as usual. The sides were not supported; and plaintiff, who did not know of the danger, was ordered to go in and dig the chamber deeper, his superior making no examination to ascertain whether it was safe to do this work. The sides caved in, and permanently injured plaintiff. The Supreme Court holds that the company was liable.[15]

In the Federal Court it is ruled that the fact that a switchman, injured while coupling cars, by reason of a hole in the track, might have selected another place to make the coupling, if he desired, will not defeat his recovery for the injury, unless he knew, or ought to have known, of the danger incurred.[16]

In a case in Maine, it appeared that a railroad was engaged in transporting and delivering gravel for D's employer; that, at the request of some of the men in charge of the gravel train, D assisted in unloading the gravel; that, while so engaged, D was injured because of a defective car that was improperly loaded. The Court rules that the road is liable, as D was not a volunteer, he being interested in the work for his employer.[17]

In the Federal Court it is held that the wanton and malicious use of the steam whistle by servants of a railroad in charge of the locomotive, while it is in use, is an act within the scope of their employment, so as to charge the company with liability for injuries caused thereby.[18]

In Alabama a railroad is not liable for loss from the act of its employee in setting fire to its warehouse to destroy evidence of his embezzlement.[19]

[1] Van Nostrand v. N. Y., L. E. & W., 29 N. Y. S., 625.
[2] McCann v. Eddy, 27 S. W. Rep., 541.
[3] Murray v. C. & N. W., 62 Fed. Rep., 24.
[4] Wilder v. St. J. & L. C., 30 Atl. Rep., 41.
[5] Ft. W. & D. C. v. Peters, 27 S. W. Rep., 257.
[6] L. & N. v. Ward 61, Fed. Rep., 927.
[7] Berger v. St. L., K. & N. W., 27 S. W. Rep., 393.
[8] Flora v. Russell, 37 N. E. Rep., 593.
[9] T. & N. O. v. Echols, 27 S. W. Rep., 60.
[10] Stanley v. C. & W. M., 59 N. W. Rep., 393.
[11] G., H. & S. A. v. Templeton, 26 S. W. Rep., 1066.
[12] Kudik v. L. V., 29 N. Y. S., 533.
[13] Haskin v. N. Y. C. & H. R., 29 N. Y. S., 271.
[14] Eastman v. L. S. & M. S., 60 N. W. Rep., 309.
[15] N. & W. v. Ward, 19 S. E. Rep., 849.
[16] L. & N. v. Ward, 61 Fed. Rep., 927.
[17] Welch v. Maine Cent., 30 Atl. Rep., 116.
[18] T. & P. v. Scoville, 62 Fed. Rep., 730.
[19] Collins v. A. G. S., 16 South. Rep., 140.

LOCOMOTIVE BUILDING.

The shops of the Pittsburgh & Lake Erie at McKees Rocks, Pa., have recently turned out two heavy shifting engines for that road.

CAR BUILDING.

The Burlington, Cedar Rapids & Northern has recently placed an order for 100 furniture cars with the Wells & French Co., of Chicago.

The Cleveland, Lorain & Wheeling has placed an order for 150 standard gondola coal cars with the Wells & French Co., of Chicago.

The Tehuantepec National Railroad of Mexico has awarded through the New York Equipment Company a contract for building 10 passenger cars to Jackson & Sharp Co., of Wilmington, Del.

The New York Equipment Company has awarded a contract to the Ramapo Iron Works for building 10 box and 40 flat cars for the Jamaica Railway. These will be equipped with Gould couplers, Westinghouse air-brakes and National hollow brakebeams.

The Michigan Peninsular Car Company, Detroit, is to build 600 of the new coal cars for the Cleveland, Lorain & Wheeling instead of 500 as printed in this column last week. The company will order altogether about 950 cars of this type, and the balance of the order will probably go to the Pullman Car Company.

BRIDGE BUILDING.

Boston, Mass.—The long discussion as to the location of the proposed new bridge across the Charles River from Boston has at last been decided by the Boston Transit Commission, which has voted to erect it a short distance west of the present Charles River bridge, the Boston terminal being on Causeway street. It has also been decided to build it as a drawbridge. The plans for the structure will be prepared by State Engineer Jackson, of Boston.

Brooklyn, N. Y.—The King Bridge Co. has secured the contract for the lift bridge over Newtown Creek, between Manhattan and Vernon avenues. The bridge will cost $418,000, and will resemble the Halstead street bridge in Chicago. Its length will be, total, 160 ft.; clear span, 140 ft. The total height will be 205 ft. The hoisting will be done by electric apparatus, the bridge being raised 144 ft. in 40 seconds. Platforms, reached by stairways, are built in each tower 30 ft. from the ground. The roadway will be lifted only to this height when canal boats are passing, and passenger traffic may thus continue uninterrupted. The bridge is to be completed within nine months after the signing of the contract.

Jersey City, N. J.—Bids for the construction of a bridge 61 ft. span and building abutments on Montgomery street over Cornelison avenue, were received as follows: Post & McCord, iron plate girder, $11,500; Clark & Company, Melan arch, $10,250. It is reported that it has been awarded to the latter.

Manchester, N. H.—Mr. E. K. Turner, Consulting Engineer, of Boston, has prepared plans for a bridge to be built across the Merrimac River by the town authorities The bridge is to be of stone with seven spans and will cost about $196,000. Mr. Turner's present plans are for a bridge 70 ft. wide, but as this would involve a large expense in widening the streets approaching the bridge, some change may be made in the width of the bridge as at present called for.

Philadelphia.—The Philadelphia & Reading road has invited bids for the erection of a new through iron girder bridge over Haines street, Germantown, on the line of its Germantown & Chestnut Hill branch. The new bridge will be a double-track structure, about 70 ft. long, and will replace the present single-track bridge.

Western New York & Pennsylvania.—Two new steel bridges have been ordered for the Buffalo division and the same number for the Pittsburgh division.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Chicago, St. Paul, Minneapolis & Omaha, 3½ per cent. on the preferred stock, payable Aug. 20.

Mahoning Coal, 3 per cent. on its common stock, payable Aug. 1.

New York Central & Hudson River, 1¼ per cent. on the capital stock of the Rome, Watertown & Ogdensburg Railroad will be paid by the New York Central & Hudson River Railroad, lessee, after Aug. 15.

Stockholders' Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Chicago, Milwaukee & St. Paul, annual, Milwaukee, Wis., Sept. 21.

Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *New England Roadmasters' Association* will hold its annual meeting on Sept. 16.

The *Roadmasters' Association of America* will hold its annual meeting at St. Louis, Mo., Oct. 8.

The *American International Association of Railroad Superintendents of Bridges and Buildings* will hold its annual meeting at New Orleans, La., Oct. 15.

The *American Street Railway Association* will hold its annual meeting at Montreal, Que., Oct. 15.

The *Freight Claim Association* will hold its next meeting on Aug. 14 at New York City.

The *American Railway Association* will hold its fall meeting at New York City, Oct. 16.

The *American Association of General Baggage and Ticket Agents* will hold its semi-annual meeting at Boston, Sept. 17.

Illinois Central, semi-annual, 2½ per cent., payable Aug. 31.

Lake Erie & Western, quarterly, 1¼ per cent., payable Aug. 15.

Nashville, Chattanooga & St. Louis, 1 per cent. on its capital stock.

Pullman Pallace Car Co., quarterly, $2 per share, payable Aug 15.

The Engineers' and Architects' Association of Southern California meets each third Wednesday of the month in the Hall of the Chamber of Commerce, Los Angeles, Cal.

The Engineers' Society of Western New York holds regular meetings the first Monday in each month, except in the months of July and August, at the Buffalo Library Building.

The *Western Railway Club* meets in Chicago on the third Tuesday of each month, at 2 p. m.

The *New York Railroad Club* meets at the rooms of the American Society of Mechanical Engineers, 12 West Thirty-first street, New York City, on the third Thursday in each month, at 8 p. m.

The *New England Railroad Club* meets at Wesleyan Hall, Bromfield street, Boston, Mass., on the second Wednesday of each month.

The *Central Railway Club* meets at the Hotel Iroquois, Buffalo, N. Y., on the second Friday of January, March, May, September and November, at 2 p. m.

The *Southern and Southwestern Railway Club* meets

at the Kimball House, Atlanta, Ga., on the third Thursday in January, April, August and November.

The *Northwestern Railroad Club* meets at the Ryan Hotel, St. Paul, on the second Tuesday of each month, at 8 p. m.

The *Northwestern Track and Bridge Association* meets at the St. Paul Union Station on the Friday following the second Wednesday of March, June, September and December, at 2.30 p. m.

The *American Society of Civil Engineers* meets at the House of the Society, 127 East Twenty-third street New York, on the first and third Wednesdays in each month at 8 p. m.

The *Western Society of Engineers* meets on the first Tuesday in each month, at 8 p. m. The headquarters of the society are at 1736-1739 Monadnock Block, Chicago. The business meetings are held on the first Wednesday at its rooms. The meetings for the reading and discussion of papers are held on the third Wednesday at the Armour Institute, Thirty-third street and Armour avenue.

The *Engineers' Club of Philadelphia* meets at the House of the Club, 1122 Girard street, Philadelphia, on the first and third Saturdays of each month, at 8 p. m.

The *Boston Society of Civil Engineers* meets at Wesleyan Hall, 36 Bromfield street, Boston, on the third Wednesday in each month, at 7.30 p. m.

The *Engineers' Club of St. Louis* meets in the Missouri Historical Society Building, corner Sixteenth street and Lucas place, St. Louis, on the first and third Wednesdays in each month.

The *Engineering Association of the South* meets on the second Thursday in each month, at 8 p. m. The Association headquarters are at The Cumberland Publish ing House, Nashville, Tenn.

The *Engineers' Society of Western Pennsylvania* meets in the Carnegie Library Building, Allegheny, Pa., on the third Tuesday in each month, at 7.30 p. m.

The *Technical Society of the Pacific Coast* meets at its rooms in the Academy of Sciences Building, 819 Market street, San Francisco, Cal., on the first Friday in each month, at 8 p. m.

The *Association of Engineers of Virginia* holds informal meetings on the third Wednesday of each month, from September to May, inclusive, at 710 Terry Building, Roanoke, at 8 p. m.

The *Denver Society of Civil Engineers* meets at 36 Jacobson Block, Denver, Col., on the second and fourth Tuesdays of each month except during July, August and December, when they are held on the second Tuesday only.

The *Montana Society of Civil Engineers* meets at Helena, Mont., on the third Saturday in each month, at 7.30 p. m.

The *Engineers' Club of Minneapolis* meets in the Public Library Building, Minneapolis, Minn., on the first Thursday in each month.

The *Canadian Society of Civil Engineers* meets at its rooms, 112 Mansfield street, Montreal, P. Q., every alternate Thursday, at 8 p. m.

The *Civil Engineers' Club of Cleveland* meets in the Case Library Building, Cleveland, O., on the second Tuesday in each month, at 8 p. m. Semi-monthly meetings are held on the fourth Tuesday of each month.

The *Engineers' Club of Cincinnati* meets at the rooms of the Literary Club, No. 24 West Fourth street, Cincinnati, O., on the third Thursday in each month, at 7.30 p. m. Address P. O. Box 333.

The *Engineers' and Architects' Club of Louisville* meets in the Norton Building, Fourth avenue and Jefferson street, on the second Thursday each month at 8 p. m.

The *Western Foundrymen's Association* meets in the Great Northern Hotel, Chicago, on the third Wednesday of each month. B. W. Gardner, Monadnock Block, Chicago, is secretary of the association.

The *Association of Civil Engineers of Cornell University* meets on Friday of each week at 2:30 p. m., from October to May, inclusive, at its association rooms in Lincoln Hall, Ithaca, N. Y.

The Southern and Southwestern Railway Club.

The next meeting of the Southern and Southwestern Railway Club will take place at the Kimball House Atlanta, Ga., on Thursday, Aug. 15 next, at 10 o'clock a. m. The subjects for discussion were published in our issue of May 24, p. 336.

International Railroad Congress, Y. M. C. A.

The International Railroad Conference of Young Men's Christian Associations is to be held at Clifton Forge, Va., Sept. 13, 14 and 15. Mr. C. J. Hicks, 40 East Twenty-third street, New York City, is Secretary of the Railroad Department of the International Committee.

M. C. B Association.

At the recent convention of the M. C. B. Association a code, or standard of efficiency, for air-brakes was submitted by the committee on air-brake tests. (See *Railroad Gazette*, page 409.) These recommendations have been submitted to the association for letter ballot, as well as those recommending that the standard size of postal cards be changed to 3¾ × 6½ in., to conform to the new style adopted by the United States government. The ballots, which closed July 29, resulted in 847 affirmative and 95 negative votes in the matter of the air-brake tests, and 867 affirmative and 8 negative in the matter of the postal card sizes. Both recommendations were hence adopted.

Western Society of Engineers.

The Committee on Entertainments and Excursions arranged a trip to Milwaukee on Monday, Aug. 5, 1895. The society left on the steamer Indiana Monday night at 8 o'clock, and arrived at Milwaukee for breakfast the next morning. During the forenoon visits to industrial works and public improvements of interest were made. In the afternoon a trip was made to one of the breweries. The return trip was on the steamer Virginia, leaving Milwaukee in time to arrive in Chicago at 10 p. m. Tuesday night.

This date was fixed to get the advantage of the full moon Monday night, and the excursion was intended as the annual pleasure outing rather than as a professional trip. The committee in charge were Messrs. E. Gerber, R. Modjeski and Geo. P. Nichols.

Society for the Promotion of Engineering Education.

The second annual meeting of this association will be held at Springfield, Mass., on Sept. 2, 3 and 4 in connection with the meeting of the American Association for the Advancement of Science, which meeting begins on Aug. 28. The programme of the meeting has been issued, although it is announced that some changes may be made in the list of subjects to be discussed and the authors of the papers when the final programme is issued. Seventeen subjects are noted in the present programme for discussion at this meeting. The subjects include, A Course of Study in Physical Science, with reports on Physics, Chemistry, Mechanics and Astronomy. Under the general subject of "Professional Studies, the subjects to be treated and time to be given to each," there will be special papers on the different branches of engineering, Prof. Crandall, of Cornell, taking up Civil Engineering in one course, H. W. Spangler, University of Pennsylvania, reporting on Mechanical Engineering. Electrical engineering, mining engineering and the general branches of civil engineering in specialized courses will also be discussed. Other papers to be read include one by Professor Johnson, of Washington University, on A Course of Construction in Engineering Materials; one by C. H. Benjamin, Case School of Applied Science, Cleveland, on The True Place of Drawing and Shop Work in Engineering Schools and one by Professor Burr, of Columbia, on The Comparative Value of Graduates' Study in Engineering Process. Other papers by teachers in engineering schools of Europe will be read under the title of "Foreign Criticisms of American Engineering Schools."

New England Roadmasters' Association.

The thirteenth annual convention of the New England Roadmasters' Association will be held at the Revere House, Boston on Sept. 18 and 19. The opening session will be on Wednesday, Sept. 18, at 11 o'clock. There will be afternoon sessions at 2 o'clock on both of these days, the morning session on Thursday being at 9 o'clock. A reception will be held on the evening of the second day.

Mr. D. H. Lovell, Superintendent of the Monongahela Division of the Pennsylvania road, will deliver an address on Wednesday evening at 8 o'clock.

The following is a list of the committee reports which will come up for discussion at this meeting:

1. How many frogs and switches shall call for an extra man in the section force?
2. Rail joints; experience with new devices.
3. Track tools, nut locks, spikes, bolts, rail-braces and tie-plates. (Continued from 1894.)
4. Tie-plates: Under what conditions are the best results obtained from their use? Their value in keeping the track to gage and in preserving the tie.
5. What has been the experience of New England Roadmasters in regard to the beveling of iron and steel rails? Is one side of the rail higher than the other, requiring that the lower side be turned in, in order to better fit the tread of the wheel?
6. How can we reduce the number of frogs carried in stock?
7. What course, if any, should the New England Roadmasters' Association pursue in order to bring into practical use the many improvements that have been discussed and approved?

Master Car & Locomotive Painters' Association.

The 26th Annual Convention of this Association will be held at Cincinnati, Sept. 11, 12 and 13, at the Grand Hotel.

Hotel rates will be $3 a day, and no extra charges. Rooms should be engaged one week previous.

The Programme of Subjects is as follows:

1. What is the best material and method for interior cleaning of passenger coaches that are not to be varnished inside? What if the inside is to be varnished? J. G. Keil, C. L. Harwood, D. A. Little.
2. What is best for exterior cleaning of passenger equipment preparatory to varnishing? John Rattenbury, J. H. Stout, John Hartley.
3. Cause, prevention and cure of cracks in parallel lines at right angles with the grain of the wood on passenger cars? J. H. Pitard, A. Hunnicke, J. R. Barr, Sr.
4. Essay—A quarter century in the Railway Equipment Paint Shop. Warner Bailey.
5. Best method, material and means of removing old paint from exterior of a passenger coach, with the detailed expense of labor and material of one coach body. Also should a burned-off coach be smoothed by carpenters? If so, does it pay? R. Marengo, L. E. Owen, Henry Block.
6. Is it advisable to continue the use of rough stuff and pumice stone in surfacing burned-off paneled coaches? J. H. Worrall, Samuel Cooper, Robt. Shore.
7. Best color and materials, with which to paint and letter freight equipment; is it advisable to varnish the outside of caboose cars? A. J. Bruning, Chas. Becker, Robt. McKeon.
8. Essay—Prospects of our trade. Does it afford sufficient attraction for intelligent apprentices? Jas. A. Gohen.
9. Is there any reliable substitute for linseed oil as a priming vehicle and with which to mix all subsequent surface coatings? What is your opinion of ready prepared primers and surfaces, without names (supposed to contain little or no lead)? Wm. O. Quest, J. A. P. Glass, F. S. Ball.
10. What is the best primer for iron to resist the action of rust (on a locomotive tank)? J. H. Taylor, John McMurtry, David James, Chas. A. Cook.
11. Exterior striping, decoration and lettering of a passenger coach, detailed cost drawings showing styles of letters, also ornaments and general plan. J. T. McCracken, Aug. Wolter.

Queries.—1. Is there any economical way to remove paint from car blinds?

2. Is shellac the best article to apply as a surfacer over a paste filler?
3. What is best method for trucks and steps: to clean and varnish; clean, paint and varnish; or clean and give one coat of varnish color or oil paint?
4. What is the best formula for a truck and step color for a passenger car painted Pullman body color?
5. How often should passenger car roofs be painted? What is the best material?
6. What objection is there to painting passenger car end doors outside, with the body color (provided that it is a dark color)?
7. Would one be justified in sanding the bull nose on the roof of a coach for durability's sake?
8. Is it advisable for the association to employ a practical chemist so that if any member desires a test made he is at liberty to send to him?
9. What should be the limit for the number of apprentices in the paint shop?
10. Is it advisable to bronze the seat back hangers in a coach?

PERSONAL.

—Mr. G. F. Richardson has been appointed Master of Transportation of the Southern Pacific, with headquarters at San Francisco.

—Mr. W. Reese, Assistant Engineer of the Western New York & Pennsylvania's Rochester division, has resigned, and taken a similar position with the Lehigh Valley in Buffalo.

—Mr. Samuel T. Rowley has just been appointed Superintendent of the Memphis Car & Foundry Co. Mr. Rowley was for some time Superintendent of the St. Louis Car Wheel Co.

—Mr. George W. Fithian, lately a Congressman from the Sixteenth District, has been appointed a member of the State Railroad & Warehouse Commission of Illinois, to succeed Mr. Charles F. Lape, removed.

—Mr. C. L. Francisco is now Assistant Superintendent of the New York & Putnam Division of the New York Central & Hudson River Railroad. He was until recently a conductor on the Empire State Express.

—Mr. J. B. Hanson, the Auditor of the Duluth, Missabe & Northern road in Minnesota, will hereafter perform the added duties of General Freight and Passenger Agent of that road on account of the resignation of Mr. G. C. Gilfillan.

—Capt. Oscar Grant, who has been Acting General Manager of the Wilmington Sea Coast Railroad (a short line running out of Wilmington, N. C.), has been recently appointed General Manager of that property, succeeding Mr. John H. Daniel, deceased.

—Mr. A. J. Grief, at present Superintendent of Terminals of the Illinois Central at New Orleans, has been promoted to be Division Superintendent of the Louisiana division, with headquarters at Vicksburg, Miss., and the office of Superintendent of Terminals at New Orleans will be abolished.

—Mr. George A. Burt, General Manager of the Ohio River road, was recently elected President of the Ravenswood, Spencer & Glenville road, which is operated as a leased line of the Ohio River road. He succeeds to the vacancy caused by the death of the Hon. Wm. Woodward about two months ago.

—Mr. M. W. Reynolds, formerly Assistant Trainmaster, has been appointed Trainmaster of the eastern division of the Lake Shore & Michigan Southern road, with office at Westfield, N. Y., to succeed I. A. McCormack, who has resigned to become General Superintendent of the Brooklyn Heights Railroad Company.

—Mr. J. F. Dunn, Master Mechanic of the Idaho division of the Union Pacific, will hereafter also act as Master Mechanic of the Salt Lake division. The former Master Mechanic, Mr. D. Patterson, will remain in charge of the Salt Lake shops as foreman, the office of Master Mechanic for the Salt Lake division being abolished.

—Mr. N. D. Wiggins, Superintendent of the Mississippi division of the Mississippi & Yazoo Valley road, which is operated by the Illinois Central, has resigned, and Mr. W. S. King, who has been Superintendent of the Louisiana division of the Illinois Central, has been transferred to Jackson, Miss., as Mr. Wiggins' successor.

—Mr. Thomas R. Freeman is now connected with the Boston Belting Company, and will look after the railroad interests of that company, having his office probably in Chicago. Mr. Freeman was for a long time connected with the Hale & Kilburn Manufacturing Co., of Philadelphia, and is a well-known member of the railroad supply fraternity.

—Mr. C. A. Boies, formerly Chief Train Dispatcher of the Union Pacific at Omaha, has been promoted to be Assistant Superintendent of the Idaho Division of the Union Pacific, succeeding Mr. S. S. Morris, resigned to enter the services of another company. Mr. Boies has been in the service of the Union Pacific for almost 20 years, although still a comparatively young man.

—Mr. Alexander Kearney, of Wilmington, Del., has been appointed Assistant Engineer of Motive Power on the United Railroads of New Jersey Division of the Pennsylvania road, with headquarters in Jersey City. Mr. Kearney will succeed Mr. C. M. Mendenhall, who was promoted some weeks ago to the position of Superintendent of Motive Power of the Philadelphia, Wilmington & Baltimore Railroad.

—Mr. W. Bryan, formerly with the Seaboard Air Line, and lately President of the Atlanta & North Carolina road, has, with Mr. C. H. McKibbin, formed the firm of Bryan & McKibbin, to deal in railroad and contractors' supplies, with office at 120 Broadway, New York City Mr. McKibbin was for a number of years connected with the Pennsylvania road, and from October, 1889, to May, 1890, was General Purchasing Agent of the Union Pacific.

—On Monday, July 29, Mr. William E. Baker, General Superintendent of the Metropolitan Elevated, Chicago, was struck by one of the motor cars of the road and badly injured. He was standing on the track, and seeing a train approaching stepped on to the parallel track and was struck by a motor car coming from the opposite direction. His shoulder was broken and his face was badly cut, and he was removed to his home on the north side of the city. He is now much better.

—Mr. Charles Dunlap, General Superintendent of the Chicago, Rock Island & Pacific, died at Chicago on Sunday last from injuries he had received in an accident on the previous Thursday at the water chutes at Chicago. Mr. Dunlap was formerly Division Superintendent on the Baltimore & Ohio, before going to the Chicago, Rock Island & Pacific in 1886. His promotion with the latter company was steady. He soon became Division Superintendent of its Kansas lines and then Assistant General Superintendent of the lines west of the Missouri River, and General Superintendent of that division in 1890. In 1893 he was transferred to Chicago as General Superintendent of all the lines of the company. He was 48 years old.

—Mr. E. F. C. Davis was almost instantly killed last Tuesday afternoon by being thrown from his horse in Central Park, New York. The precise nature of the accident is not known, as no one has been found who saw it. At the time of his death Mr. Davis was President of the American Society of Mechanical Engineers and General Manager of the C. W. Hunt Co., New York. The latter duties he took up last April, having been before that time General Manager of the Richmond Locomotive & Machine Works. His family still lived in Richmond, Va. He became a member of the Society of Mechanical Engineers Nov. 4, 1881, and was Vice-President 1891 to 1893. He was a man of fine qualities and high standing, personally and professionally.

—Mr. Ira A. McCormack, Trainmaster of the Lake Shore & Michigan Southern road at Westfield, near Buffalo, N. Y., has resigned that office to accept an important position with the Brooklyn Heights Railroad, the most important electric street railroad in Brooklyn, N. Y. Mr. McCormack will be Superintendant of the lines of that company in the Eastern District of Brooklyn, and will have charge of the operation of about 100 miles of track, having under him three Division Superintendents as assistants. Mr. McCormack is now about 38 years old, and has had an extensive railroad experience. He was for a number of years a brakeman on the Pennsylvania, and became Roadmaster of the Fort Wayne road. He was later connected with the Lake Shore and the Pittsburgh & Lake Erie, and with the New York Central & Hudson River. In 1892 he was connected with the Hall Signal Company, being located at Chicago; and in October, 1893, was appointed Trainmaster of the East

ern Division of the Lake Shore road, holding that position until his recent appointment with the Brooklyn Heights Company.

—Mr. J. A. Fillmore, General Superintendent of the Southern Pacific Company, has been chosen General Manager to succeed to the vacancy caused by the recent death of Mr. A. N. Towne. Mr. Fillmore's promotion to this office was generally anticipated, although his appointment was not expected at so early a date, as President Huntington is now in Europe. Any changes that might be made it was thought would be delayed until his annual trip to the Pacific Coast in September. Mr. Filmore's former office as General Superintendent has been filled by the promotion of Mr. A. D. Wilder, who is at present Division Superintendent at San Francisco. Mr. Filmore has held the office of General Superintendent since 1882, and altogether has been with the Central and Southern Pacific companies nearly 24 years. He was born in New York State in 1845, and his first railroad work was as a brakeman on the Delaware, Lackawanna & Western. He was promoted until he became Superintendent of Construction on that road and the Morris & Essex, having charge of second track work on both roads; but in 1869 he went west to the Union Pacific. He was Division Superintendent on several divisions of the Central Pacific, and also the Soutnern Pacific until 1880, when he was promoted to be Assistant General Superintendent of the latter company.

—Mr. L. L. Buck, who has been appointed by the Commissioners of the new East River Bridge as Chief Engineer, is an engineer of such standing that it seems hardly necessary for us to say what he has done; and yet we question if his name is much known outside the profession. As a very young man Mr. Buck fought through the war, winning a commission. He then graduated as a civil engineer from Rensselaer Polytechnic Institute. The first work in which he distinguished himself was building the Verrugas viaduct on the Lima & Oroya Railroad, which was at that time, we believe, the highest bridge in the world, spanning a very difficult gorge. The boldness and originality of Mr. Buck's work here attracted great attention and gave engineers an insight into what he could do. Later he was engaged in various engineering work, building bridges in many different regions; and finally, in 1886-87, accomplished the brilliant feat of renewing the towers and suspended structure of the suspension railroad bridge at Niagara without stopping traffic. This has always been regarded by critics as a work of extraordinary skill and daring. Mr. Buck has been ever since Consulting Engineer to the bridge company and consequently has had a chance to watch closely the most important railroad suspension bridge in the world. Meantime, he has designed and built a number of important bridge structures. He has on hand now designs for two steel arch bridges to span the Niagara gorge, one of 840 ft., which will replace the upper suspension bridge and which will probably be built very soon, as specifications are out for bids for the masonry now. The other one is for a steel arch of 550 ft. to take the place of the present railroad bridge.

He is a Director in the American Society of Civil Engineers, and a member of the Century Club of New York and the Loyal Legion.

ELECTIONS AND APPOINTMENTS.

Cincinnati, Hamilton & Dayton.—At the annual election of the stockholders at Cincinnati, July 30, the following officers were elected for the consolidated company: Henry F. Shoemaker, Wilberfoce Sully, Rush Taggart, Fellows Davis, Mahlon C. Martin, John H. Taylor, George W. Davis, Robert C. Schenck, Melancthon D. Woodford, Eugene Zimmerman, Lawrence Maxwell, Frederick H. Short and George R. Balch. Messrs. Fellows, Davis, Taggart, Schenck, Short and Balch are new directors, representing the Delphos & Ironton roads, recently absorbed. The other eight directors were in the old board.

Union Pacific.—James Latimer, Roadmaster at Nephi, Utah, will hereafter have the entire Utah division under his charge as Roadmaster, the office of Roadmaster at Salt Lake City being abolished.

RAILROAD CONSTRUCTION, Incorporations, Surveys, Etc.

Atlantic Coast Line.—This road is continuing the improvement of its property in North Carolina, including the substitution of 70-lb. rails for the 56-lb. section now in use on that part of its line extending from Wilson to Fayetteville, N. C.

Buffalo & Susquehanna.—Sept. 10 is now announced as the date on which the extension of this road beyond Galeton to Perryville, N. Y., will be completed and opened for traffic. The extension connects at Perryville with the Wellsville, Coudersport & Pine Creek road, which gives the Buffalo & Susquehanna an important connection with the New York, Lake Erie & Western at Wellsville, N. Y. The Wellsville, Coudersport & Pine Creek Railroad has been recently purchased by the owners of the Buffalo & Susquehanna road and will hereafter be operated in connection with the other lines of the Buffalo & Susquehanna.

Coudersport & Port Allegheny.—The contractors are now erecting the four important steel bridges on the new division between Coudersport and Ulysses, Pa. Two of these bridges are at Coudersport. Trains on the new line will probably be run through to the northern terminus by Sept. 1 next, to connect with the Fall Brook road at that point. The extension now building is about 23 miles in length.

Coast Railway of Nova Scotia.—Work on this road is now making considerable progress. The grading is completed from Yarmouth to Argyle, 22 miles, and will be finished to Pubnico, 35 miles, this year. Rails for 25 miles of track are now on the way from England, to be delivered at Yarmouth in August. Contracts were made in July as follows: With Harry Townsend & Co., of New Glasgow, N. S., for the completion of the culverts and bridge masonry on the first 30-mile section (the masonry work on the first 10 miles is now practically completed); with the Central Bridge and Engineering Co., of Peterborough, Ont., for steel bridges, all to be delivered Oct. 1; With Warren Taylor, of Salisbury, N. B., for ties, and with Strathy & Co., of Montreal, Can., for fencing. It is the intention to build and put in operation this division of the road this year. The road was originally commenced as a 3-ft. gage, but this year an act was passed in the local legislature permitting the company to change to standard gage, and all work, bridges, etc., are being constructed for standard gage.

Choctaw, Oklahoma & Gulf.—The chief engineer now expects that all the construction work on the middle division of this road, which has been under construction during the summer, will be completed within three weeks and the line then opened for traffic between the connection with the St. Louis & San Francisco at Wister Junction, and the Chicago, Rock Island & Pacific at the Western terminus at El Reno. The new line is about 112 miles long between South McAlester and Oklahoma City. The most important construction work on the line has been the building of the bridge across the South Canadian River in the Indian Territory. The total length of the through line will be about 210 miles.

Depew & Tonawanda.—Smith & Keep, railroad contractors of Rochester, have been awarded a contract for building this branch road from Depew to Tonawanda, just north of Buffalo, 14 miles. The contractors' outfit has arrived on the ground and the construction work will be in full progress within a few days. The new road is generally supposed to be in the interest of the Lehigh Valley.

Kennett & Rector.—This company was incorporated in Missouri last week. The road is to extend from Kennett, in Southeast Missouri, west to Rector, a distance of 12 miles. The capital stock is placed at $120,000, and the incorporators are W. F. Sheldon, T. E. Baldwin, D. B. Punkey, W. G. Bragg and R. R. Ely.

Monroe & Toledo.—This road was organized two or three years ago to build a new line into Toledo to give the Flint & Pere Marquette road an entrance to that city. Some right of way was secured but the work was then allowed to lapse. It is now stated, however, that the Flint & Pere Marquette has decided to again take up the construction of the line and that the balance of the right of way will be secured at once and the line put under contract this fall. It will be about 20 miles long and a connection will be made in Toledo with the Columbus, Hocking Valley & Toledo road.

Montana Midland.—Recently a party of engineers has been organized at Helena to make another survey of the proposed road to the coal mines in southeastern Montana. This railroad is a project of R. A. Harlow, of Helena, who has been promoting it for two or three years. About a year ago the roadbed was graded for 20 miles east of Helena to the crossing of the Missouri River. The work was suspended at that point and Mr. Harlow has up to this time not been able to make arrangements to do any further work. It is now stated that the work beyond the Missouri River crossing will be in progress within 30 days. There will be some heavy work on the grading, which is now to be undertaken, the line crossing the mountains to reach the mines, which are situated about 80 miles southeast of Helena.

New Orleans & Western.—Joseph Stewart & Co., contractors of St. Louis and Buffalo, have been awarded important contracts for work on this terminal railroad at New Orleans. The contracts include the construction of a grain elevator with a capacity of 750,000 bushels; one of the largest cotton warehouses ever built in this country and for grading the yards at the terminal at Point Chapellete. This railroad is being constructed by the Delta Construction Co., of which Mr. A. W. Stanitz is Chief Engineer. As indicated by the contracts noted above, the plans of the company are very extensive. Over 30 acres of valuable land has been purchased as a site for the warehouses and yards. The proposed belt line around the city of New Orleans will be about 20 miles long. J. L. Nesbit, of 40 Wall street, New York, is the President. Other particulars of the company's plans were given in this column in our issue of July 5, page 455.

Fort Jervis, Monticello & New York.—Hon. Charles D. Haines, President of the company, proposes to build an extension of the Summitville division west to Kingston, N. Y., on the Hudson River. It is the intenton of the Haines Bros., the contractors, to build this extension, providing the people along the line contribute the right of way.

Queen Anne.—The first division of this road, which will be put under contract, will be the western section from Queenstown on the east side of Chesapeake Bay to Denton, Md. This will involve the construction of 23 miles of road, and the contract for the work will be given out immediately. The Peninsular Construction Company has recently been organized to construct the entire railroad from Chesapeake Bay to the Atlantic Coast at Lewes, Del. The offices of this company are in the Guardian Trust Company's building, Baltimore, and Douglas H. Gordon is President. Edward Stabler, Jr., Secretary, and R. W. Smith, Treasurer of the Construction Company. Alexander Brown, B. S. Johnston and E. F. Abell, of Baltimore, are among the directors. The railroad between Queenstown and its eastern terminus at Lewes will be 55 miles long, and there will be a short branch from Lewes to Rehoboth Beach. Steamers will cross Chesapeake Bay to connect with one of the roads entering Baltimore from the South. The object of the line is to give the counties which will be crossed by the new line a more direct connection with Baltimore, which will be placed within 85 miles of Delaware Bay by the construction of the road. William H. Bosley, of Baltimore, is the President of the railroad company.

Southern Pacific.—The company is constructing a line, two miles long, from Alvarado, in Alameda County, on the narrow gage line, to a point on the broad gage, two miles west of Decoto, Cal. This is being done by arrangement with the Alvarado Beet Sugar Co., which bought a right-of-way, at the expense of about $5,000, and deeded it to the Southern Pacific. The motive on the part of the sugar company was a desire to get cheaper transportation for its beets from Pleasanton, where a considerable part of its supply is produced, and to enable it to load its products on standard gage cars at its factory.

Southport & Western.—This proposed new road in North Carolina will now be built, as the county elections on the question of issuing bonds for its construction have resulted favorably. It is not known yet, however, just when the work will begin.

Terminal Railway of Buffalo.—The New York State Railroad Commissioners this week voted to grant the application of the projectors of this line for authority to build the road, as required under the railroad law of the state. The Commissioners had before them an application from a second company, the Depew & Southwestern, to build over practically the same route as that proposed by the Terminal Railroad of Buffalo, a line from the town of Depew, just east of Buffalo, southwest to the town of Blasdell, a station on the Lake Shore & Michigan Southern road, southwest of Buffalo. The distance between the two points is about 14 miles. As explained in our issue of July 12, the Terminal Railway is the project of Mr. H. Walter Webb, Vice-President of the New York Central, and the Depew & Southwestern project is supposed to be supported by the Lehigh Valley. The last-named line was organized in connection with the Depew & Tonawanda, which proposed to build from Depew northwest to Tonawanda. The application of that company for authority to build this proposed road was immediately granted by the Commissioners, no opposition being made at the hearing a few weeks ago. Mr. W. S. Bissell, of Buffalo, the attorney of the Depew & Southwestern insists that the action of the Commissioners at the meeting at Albany on Aug. 6, when authority was granted to the Terminal Railway to build between Depew and Blasdell, was not in regular order, and he will contest the right of the Terminal Company to construct its road under that order.

Terre Haute, Sailor Springs & Mt. Vernon.—A new survey for the line between Mt. Vernon and Sailor Springs, Ill., is now being made under the direction of Mr. R. H. Cole, of Terre Haute, the Chief Engineer. Sailor Springs is about 47 miles northeast of Mt. Vernon and the line is to be continued beyond that town to Terre Haute, Ind. Dr. F. B. Schaife, of Sailor Springs, President of the company, says that he has arranged for the funds for this section of the line and repeats the announcement made some weeks ago that the contract will be let immediately for the division in Illinois, from Mt. Vernon to a point on the Indiana State line beyond Sailor Springs. Mr. F. C. Pugh, of Terre Haute, is General Manager and will have charge of the construction of the line.

Washington County.—The towns in Washington County, Me., which voted against aiding issued bonds to the road, are to test the constitutionality of the act allowing the county to subscribe $50.000 for the preferred stock of the railroad.

Wisconsin Central.—The Milwaukee & Lake Winnebago, one of the operated roads of this company, has recently filed amendments to its charter providing for an additional issue of stock to the amount of $1,280,000. and for a new issue of divisional first mortgage bonds, amounting to $1,000,000, bearing 6 per cent. interest and payable in 30 years. These securities will provide funds for constructing a new line to Lake Michigan and ferry slips, docks, etc., and the boats for a car ferry across Lake Michigan. The new railroad will be about 47 miles in length, extending from Neuah in an easterly direction of Menasha, and thence to Manitowac, Wis., on Lake Michigan. The terminals at that town will, it is estimated, cost about $500,000. The eastern terminus of the car ferry across Lake Michigan will be at Ludington, Mich., where connection will be made with the Flint & Pere Marquette.

GENERAL RAILROAD NEWS.

Aberdeen & West End.—This short road, owned by A. F. Page, of Aberdeen, N. C., and operated by him, is said to be the best paying piece of railroad property (in proportion to its length and the amount of capital invested), in North Carolina. For the last fiscal year it yielded its owner a net profit of $36,000.

Altoona, Clearfield & Northern.—It was announced last week that the Pennsylvania has purchased this road for $30,000. The line extends from Altoona to Dougherty, is 15 miles long, and was controlled by Samuel P. Langdon, of Philadelphia, who was President of the company. It has had a litigious existence and only a few weeks ago was taken out of the hands of receivers. Mr. Langdon secured the road for the purpose of securing an entrance into Altoona for his Altoona & Phillipsburg Connecting Railroad, and it is said he now contemplates an entrance into that city by another route to be constructed.

Augusta & Savannah.—A majority of the stockholders have decided to accept the offer of the Georgia Central Railroad Reorganization Committee of 5 per cent. on the capital stock. Under the old lease 7 per cent. was paid.

Chicago & South Side Rapid Transit.—In accordance with a resolution passed by the Board of Directors, July 24, 1895, a special meeting of the stockholders of the Chicago & South Side Rapid Transit Company is called for Tuesday, Sept. 3, for the purpose of considering measures to be taken to discharge the interest on first mortgage bonds, which was due April 1, 1895, and also the interest on extension bonds due July 1, 1895. The semi-annual statement which accompanied this call shows a gain over the same period for last year, yet the earnings are still far from sufficient to meet this indebtedness. The following is the statement up to July 1:

Receipts.

Cash on hand, Jan. 1	$55,291
Passenger earnings	365. 51
Rents	2,73
News and advertising privileges	12.623
Miscellaneous	4,283
Total	$138,118

Disbursements.

General taxes	$5.005
Operating expenses	301,274
Total	$326 279
Cash on hand, July 1	111,838

Out of this must be deducted the current liabilties in pay rolls, supplies, etc., amounting to $31,290.57, which leaves a net balance of $80,547.92. This is all that is available to meet the interest on.

First mortgage bonds due April 15, 1895	$187,500
Extension bonds due July 1, 1895	75,000
	$ 62,500

From these figures it can be seen that there is a deficit of $181,952.08, and there is an urgent necessity for issuing this call.

The comparison of the earnings and operating expenses is shown by the following table:

Earnings.

	Jan. 1 to June 30, 1894.	Jan. 1 to June 30, 1895.
Passenger	$359,419.25	$364,62 .54
Rents	4,100 30	2,705.33
News and advertising privileges	6,964.13	10,046.75
Miscellaneous	49.94	417.36
Total	$350,533.62	$377.790 98

Operating Expenses.

	Jan. 1 to June 30, 1894.	Jan. 1 to June 30, 1895.
Maintenance of way and structure.	$19,941.56	$17,878.34
Maintenance of rolling stock	15,075.87	17,110.03
Conducting transportation	224,639 83	185,066.58
General expenses	46,399.65	60,247.67
Total	$306,106.91	$280,402.62

This shows a gain in the earnings of $27,257.36, and a decrease in operating expenses of $25,604.29 on a total gain of $52,861.65. The percentage of operating expenses to earnings for January to July, 1894, was 87.4, while for the same period this year it is 74.3. This is a creditable showing for the management, but shows that unless there is a very decided increase in the passengers carried it will not be possible to pay the interest on the bonded indebtedness.

Chicago, Milwaukee & St. Paul.—The statement of earnings for June shows a large saving in operating expenses. Gross earnings fell off $120,076, but by reducing expenses $277,998, a net gain of $157,921 is shown. Compared with 1893, gross earnings are less and net earnings are less. The comparative exhibit for June and the fiscal year follows:

June:

	1895.	1894.	1893.
Gross earn	$2,263,865	$2,383,941	$2,904,741
Oper. exp	1,145,478	1,123,476	1,845,836
Net earn	$1,118,386	$930,464	$1,058,905
P. c. of exp. to gross earn	53⅝	59¼	63⅝

For the twelve months:

	1895.	1894.	1893.
Gross earn	$27,335,369	$31,327,950	$35,743,428
Oper. exp	17,043,763	20,114 332	23,712,943
Net earn	$10,291,616	$11,213,618	$12,030,485
P. c. exp. to gross earn	62⅜	64⅛	66⅜

Columbus Southern.—The United States Circuit Court of Atlanta, Ga., on Aug. 1, appointed P. E. Blanchard, of Columbus, Ga., Receiver of this property. The application for a Receiver was made by the Central Trust Co., of New York, trustees of the mortgage bonds, amounting to $1,087,000. The interest on these bonds, has been in default for over two years. The road is about 87 miles long and extends from Columbus to Albany.

Duluth & Iron Range.—The Minnesota Iron Co., which owns all of the outstanding stock of the railroad, has sold the $400,000 first mortgage five per cent. bonds of that company which it held in its treasury. They were taken for investment by capitalists already having large interests in both companies. The stock exchange quotation for the stock has advanced lately, and is now 98. The officers make a statement showing that the net earnings in 1894 were $799,588, or nearly three times the interest on its bonded debt, and the surplus was of $523,636, making the total surplus on Dec. 31 last $1,790,875. In addition to the 170 miles of road operated by the company it has ore docks, shops and yards on Lake Superior that cost over $1,500,000, and which are under the lien of the first mortgage. The principal business of the company is handling the traffic of the Minnesota Iron Co.

Louisville & Nashville.—The company gives notice to the holders of its ten-forty adjustment six per cent. bonds that the entire issue is called for payment on Feb. 1, 1896, pursuant to the terms of the mortgage securing them, and principal and interest will be paid on that date upon presentation of the bonds at the office of the company. The company has decided to cancel the bonds of the Mobile & Montgomery road, all of which are held by the Louisville & Nashville. That company has sold to Messrs. Kuhn, Loeb & Co., of New York, $2,000,000 of its 4 per cent. unified gold bonds, and $4,000,000 of its 4½ per cent. first mortgage 50-year gold bonds, issued as a joint obligation of the Louisville & Nashville and Mobile & Montgomery companies, and secured by a first lien upon the last-named road.

Macon & Northern.—The security holders of this company having rejected the terms given to them under the reorganization plan of the Central of Georgia, issued by Messrs Thomas and Ryan, now find themselves forced to assume the management of their property. Some weeks ago the committee of the bondholders received an offer from a connecting line for the operation of the road, and a meeting of the bondholders was held at Baltimore last week to consider this proposition. At that meeting, however, the committee having charge of the negotiations announced that the offer had been withdrawn. The committee, however, stated that satisfactory settlement might yet be made with the reorganization committee of the Central of Georgia, which company has guaranteed the bonds of the Macon & Northern. It is stated that the road is now in good physical condition, and that all net earnings are being used for further improvement of the property.

New York & New England.—Judge Wallace, of the United States Circuit Court, at New York, has formally approved the recent sale of this property to the reorganization committee. The directors have also formally voted to transfer the property to this committee, as representing the purchasers, and as soon as the committee secures similar orders from the United States Courts in the three states through which the road passes, the actual transfer of the property will be made. There is considerable speculation as to the present ownership of stock, or rather the certificates issued by the reorganization committee to those stockholders who paid the assessment named in the reorganization plan. The reorganization committee professes to have no information as to the holders of these certificates, and if any particular interest has secured control it is not likely to make public its ownership until the stockholders meet and new directors are elected. The officers of the New York, New Haven & Hartford continue to repeat, as they have had occasion to do for many years, that that company does not control the New England property. J. P. Morgan & Co., the New York bankers, who are credited by the daily newspaper reporters with having a controlling interest in practically every railroad undergoing reorganization, or needing reorganization, are also said to have secured control of the stock of the New England, and that may be as good as any other guess.

New York Central & Hudson River.—The gross earnings for July, 1895, were $3,545,498, as compared with gross earnings of $3,158,003, an increase of $387,495.

Norfolk & Western.—The London Reorganization Committee has recently issued a circular to the security holders concerning the present status of the reorganization plan. The circular states that, under the direction of the London committee, a firm of accountants recently made a thorough investigation of the accounts of the Norfolk & Western for the last three years and that the report to the committee confirms the accuracy of the statements as made by the company's officers. The circular goes on to state that the terms for reorganization have been receiving the constant attention of the committee which have been in communication with the committees in New York and Amsterdam as well as large foreign interests. It is now believed that a plan of reorganization can be submitted to the security holders as soon as the affairs of the company are in a settled condition, the recent strike of miners along the company's lines having caused an unexpected difficulty.

North Carolina.—The Southern Railway has already commenced the important improvement of the roadbed of this property, not waiting the result of its negotiations for a renewal of its present lease on the railroad, which does not expire until 1901. The officers of the Southern Railroad suggested a renewal of the lease of the road on the present terms this year.

The improvements now started include the substitution of a heavier rail section on the line from Greensboro via Raleigh to Selma, about 83 miles, which will be the portion of the road to be used as the Southern Railway's line to Norfolk. Important bridge improvements are also to be made on this part of the road, and many heavy iron structures will be erected to replace the present bridges.

The question of the renewal of the lease was brought up at this time, six years before the present lease expires, because of the contemplated improvements on the North Carolina road in anticipation of using it as a part of the Southern Railway line to Norfolk. Three-fourths of the capital stock of the North Carolina road is owned by the state of North Carolina and the state directors are not in favor of deciding the question of the renewal of the lease at the present time, and they also believe that a larger rental should be paid by the Southern Railway. The officers of the Seaboard & Roanoke have also stated in interviews in the newspaper press that that company would be prepared to submit propositions for leasing the road when the present lease expires. The general sentiment throughout the state is against arranging a new lease at the present time, but seems to be in favor of having the Southern Railway continue to operate the road.

Northern Ohio.—The Lake Erie & Western has practically concluded negotiations for the acquisition of the Northern Ohio Railway, consisting of 165 miles of road, from Delphos to Akron, O. This road was constructed as the Pittsburgh, Akron & Western Railroad, but is being reorganized under the title mentioned above. It was recently sold under foreclosure of a mortgage for $3,630,000. The bonded debt of the reorganized road, which the Lake Erie & Western will lease in perpetuity, will be $2,500,000, upon which the lessee will guarantee interest at the rate of 5 per cent. per annum. The lessee is to receive $1,000,000 in cash from the proceeds of the new issue of bonds, all of which is to be expended upon the roadbed and for equipment of the leased line. The acquisition of the Northern Ohio Railway will give the Lake Erie & Western access to the great freight producing regions of the Mahoning Valley and the Pittsburgh, the Allegheny, and the McConnellsville coke regions.

Pine Bluff & Eastern.—The Farmers Loan & Trust Company, of New York, last week applied to the United States Court at Little Rock, Ark., for the appointment of a Receiver for this road and also for the Stuttgart & Arkansas River road. The two companies are independent of each other, but F. M. Gillette, of New York City, is President of both companies. The Pine Bluff & Eastern operates about 30 miles of road, from Pine Bluff easterly to the small town of English, the road running for most of the distance north of the Arkansas River. An extension of about 15 miles east of the present terminus will connect it with the Stuttgart & Arkansas, a north and south road. The petition will be heard at Ft. Smith, Ark., on Aug. 12.

Queen Anne & Kent County.—This road is to be sold at sheriff's sale on Sept. 10 to satisfy judgments held against the property by the Pennsylvania Railroad. The line is about 26 miles long, extending from Townsend to Centerville, Md., and has been operated as a part of the Delaware division of the Philadelphia, Wilmington & Baltimore. The Pennsylvania Railroad will undoubtedly purchase the property at the sale on Sept. 10.

Savannah & Western.—A meeting of the first consolidated mortgage bondholders who have deposited their bonds with the committee, of which Mr. Simon Borg is Chairman, has been called for Aug. 26, for the purpose of ratifying the contract made by the committee with Messrs. Samuel Thomas and Thomas F. Ryan in behalf of the reorganized Georgia Central. The consent of the holders of 60 per cent. of the certificates representing bonds deposited with the committee is necessary to the ratification of the contract. The committee recommends the acceptance of the Georgia Central plan of reorganization, as modified through its efforts in favor of the Savannah & Western security holders.

Valley (Ohio).—Judge Ricks, of the United States Court at Cleveland, last week delivered his decision in the foreclosure suit and the road was ordered sold. The suit is by the Central Trust Co., of New York. The court found that on the first mortgage, which was originally $1,600,000, there is now due $2,308,895.77. The sale must be for not less than $2,000,000. The second mortgage was originally $2,400,006, and the judge finds that that there is now due $3,022,110 on it.

TRAFFIC.

Traffic Notes.

The American Line steamship Paris took 10 carloads of California fruit from New York for London on August 1.

At Baltimore one day last week, the Baltimore & Ohio had to sell 40 carloads of watermelons at auction, the value of the goods having fallen so much that the consignees refused to take them.

The principal roads carrying freight from Philadelphia and Baltimore to the Southern States, with the steamship lines interested, held a meeting in New York City last Tuesday and made up their quarrel about rates, which had threatened to cause considerable disturbance.

The Sunset Limited fast express train, which was run by the Southern Pacific last winter between New Orleans and San Francisco, is to be put on again October 1, and it will run twice a week, instead of once, as before. Trains will leave New Orleans on Monday and Thursday mornings.

The Brooklyn Union Elevated Railroad, of Brooklyn, N. Y., now runs trains through from the terminus of the East River bridge to Manhattan Beach, a connection between the elevated structure and the surface line of the Brooklyn, Bath & West End Railroad having been made at Thirty-sixth street. Trains run every half hour and make the trip in 35 minutes.

Three of the steel canal boats which will be operated by the Cleveland Steel Canal Boat Company are to be loaded at Lorain, O., with rails for the Broadway and Staten Island railroads of New York. Two more of the boats will be loaded with export flour at Cleveland, and this week the five vessels will start for New York, going via Lake Erie to Buffalo, and thence down the Erie canal in tow of a propeller. The canal boats, which have been built with a view to making them seaworthy on the lakes, are of 270 tons each, 98 ft. long over all, 17½ ft wide and 10 ft. molded depth.

The Interstate Commerce Commission has decided the case of the Michigan Box Company vs. the Flint & Pere Marquette, the Michigan Central and other roads. It is found: The roads maintained a rate of 15 cents on box shooks, and a rate of 12 cents on lumber, laths and shingles from Bay City to Buffalo. The charges on lumber and box shooks are about $43, and on shingles about $36 per carload. The rates are the same from Bay City to Cleveland and to points in Illinois, Indiana, Ohio and other states. It is held that the higher rates on box shooks were not justified and were excessive, but as the excessive rates have been reduced by the companies prior to this decision, no order is necessary.

The Chicago, Burlington & Quincy, Chicago, Milwaukee & St. Paul, Illinois Central and Chicago & Northwestern roads have had to require a description of the passenger on their 25 ride commutation tickets between Rockford and Chicago, the merchants of Rockford having complained that their trade suffers severely on account of the low fare to Chicago. The difference in price between the round trip on one of these tickets and the regular rate is $2.10, the regular ticket being $5 and the commutation only $2.90. These tickets, although they are non-transferable, have been handled largely by scalpers, hence the complaint of the merchants. The new tickets will bear a description of the personal appearance of the purchaser and they will have a coupon for each ride. This coupon must be signed by the passenger, and the signature will be compared to the one on the ticket.

Chicago Traffic Matters.

CHICAGO, Aug. 7, 1895.

The meeting of western passenger agents at St. Louis last week failed to materialize after all. The last road to kick over the traces was the Union Pacific, which declined to be a party to any trans-Missouri agreement until the Rio Grande Western came in. An attempt was made to take up the eastern agreement again, but no headway was made. The Atchison flatly refuses to join another association that does not provide for business both east and west of the Missouri River. Another matter which stands in the way of the formation of an association east of the Missouri River is the probable outcome of the arbitration of the differences between the Alton and the Wabash over the East St. Louis—St. Louis-Kansas City rates of fare. The matter has been argued before the arbitrators, but no decision has been rendered and it is surmised that some "snag" has been run against.

The Missouri, Kansas & Texas people attempted to get the other lines to attend a meeting to consider rates from Texas, but the Atchinson politely told them that when they wanted to fix up rates both ways a meeting could be had, but until then the Atchison would not be represented.

The Western Classification Committee, as I predicted, decided to adopt the compromise recommendation of the Western Freight Committee and have reduced the minimums on about 100 commodities instead of some 400 as requested by the St. Paul. The more important changes are as follows:

"Bank, saloon and office furniture, from 15,000 to 10,000 lbs.: class advanced from 3d to 2d. All other furniture, 15,000 to 10,000; class advanced from 3d to 2d. Wooden and paper boxes, 24,000 to 20,000; class advanced to 3d. Coffins, 16,000 to 10,000, and coffin boxes, 24,000 to 10 000; class advanced to 3d. Demijohns, 24,000 to 16,000; class advanced to 3d. Berry boxes, 24,000 to 10,000; class advanced to 3d. Agricultural implements, except fanning mills and feed cutters, 24,000 to 20,000, with no advance. Fanning mills, 24,000 to 12,000; class advanced to 3d. Feed cutters, 24,000 to 15,000; class advanced to 3d. The new minimums are to be made effective Sept. 15. It is stated that the furniture shippers who own their own cars are exceedingly angry at the action of the committee in raising the classification, as they always load more than the minimum, and the new arrangement will operate to raise rates 10 cents per 100 lbs., from Chicago to the Missouri River on their shipments.

The "Soo" line has again succeeded in getting itself disliked by the St. Paul-Chicago lines through its action in making a rate of $29 from St. Paul to New York for excursionists attending the total abstinence convention this week. The Central Traffic Association lines agreed not to join in the rate, but subsequently the Grand Trunk and Wabash agreed to help the Western lines out by prorating via Montreal at the "Soo" rate.

The action of some of the boat and rail lines in quoting low excursion rates from Chicago to Niagara Falls has stirred up the Chicago & Grand Trunk and it has announced a round trip rate of $7 from Chicago to the Falls for Aug. 16.

The Chicago & Ohio River lines are trying to get an agreement for the division of passenger business, but so far have not been successful. It is stated that the Big Four stands out.

Range cattle are beginning to move freely, some two weeks ahead of the usual time, and are said to be in better condition than for several years past.

The advance in the lake rate on corn to Buffalo is well maintained at 1¼ cents per bushel, notwithstanding a light demand for tonnage. The reason given for this is that the line boats have no difficulty in filling their cargoes with package freight. Iron ore rates from Lake Superior ports are firm and advancing and vessel owners are much encouraged over the outlook.

Eastbound all-rail rates are apparently well maintained. Western rates are still in a precarious condition, but no open rupture is likely to occur. The general impression is that each road is looking out for itself and ignoring the actions of its competitors as much as possible rather than precipitate any open reductions in rates in the face of the prospective heavy tonnage.

The shipment of eastbound freight, not including live stock, from Chicago, by all the lines for the week ending Aug. 5, amounted to 43,330 tons, against 41,644 tons during the preceding week, an increase of 1,686 tons and against 47,783 tons for the corresponding week last year. The proportions carried by each road were:

Roads.	Week to Aug. 5.		Week to July 27.	
	Tons.	p. c.	Tons.	p. c.
Michigan Central	4,064	9.4	4,030	9.6
Wabash	6,153	14.4	5,726	13.8
Lake Shore & Mich. South.	5,058	11.7	5,152	13.1
Pitts., Ft. Wayne & Chicago	4,868	11.2	5,909	11.2
Pitts., Cin., Chi. & St. Louis.	5,779	13.4	4,497	10 8
Baltimore & Ohio	3,208	7.2	3,450	8 3
Chicago & Grand Trunk	4,124	9.5	3,454	8.3
New York, Chic. & St. Louis	5,430	12.5	5,605	13.5
Chicago & Erie	3,641	8.4	2,232	5.4
C., C., C. & St. Louis	1,005	2.3	1,298	3.0
Total	43,330	100.0	41,644	100.0

Of the above shipments 1,318 tons were flour, 14,682 tons grain and mill stuff, 9,041 tons cured meats, 8,143 tons dressed beef, 1,813 tons butter, 1,278 tons hides, and 5,078 tons lumber. The three Vanderbilt lines carried 33.6 per cent., the two Pennsylvania lines, 24.6 per cent.